The Gas Journal

AUGUST 8, 1934

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Editorial Notes

Certification of Appliances

In the "JOURNAL" for June 20 last we suggested that our Industry should consider the advisability of establishing a central testing laboratory and queried what obstacles lie in the way. As our readers are aware, in America all types of gas apparatus undergo vigorous examination at the Cleveland Laboratory of the American Gas Association, and if approved are badged with the "Blue Star"—the symbol of satisfactory performance and complete safety in use. To our mind such a symbol has great propaganda value—it tickles the palate of the public. In Denmark and the Netherlands a somewhat similar plan is in operation. The Canadian Gas Association has a Laboratory Approval Division which issues a "Seal of Approval." The French Gas Industry is of opinion that official certification not only constitutes one of the best forms of propaganda but encourages co-operation between the engineering and the appliance manufacturing branches; and in France also a scheme of merit badging has been adopted.

It is some years since the New South Wales Commercial Gas Association set up a central laboratory to stamp with a "Seal of Efficiency" all appliances which emerge successfully from the ordeal of stringent investigation. The scheme developed, and we learn from the Gas Companies' Association of Australia of the success of their certification plan. The work carried out at the Association's laboratories, we are informed, "has already proved of definite value and assistance to appliance manufacturers." The constitution of the scheme has just been altered to permit a more definite linking-up of gas appliance manufacturers with this division of the Association's activities. With such evidence of the value of all these schemes in the several countries quoted, it does seem a little surprising that we are shelving the question in our own country.

The Gas Unit

The adoption of a "gas unit" throughout the Commonwealth was discussed at a recent conference of executives of gas companies held under the auspices of the Gas Companies' Association of Australia. The decision was reached that the future policy of the Gas Industry throughout Australia should be the adoption of a uniform unit *basis of charge*—a unit of 3,412 B.Th.U., directly comparable with the electrical unit. This decision was made largely as the result of experience in New South Wales. In the past, it was stated, architects, builders, and contractors had reached decisions on information from the electrical trade, but the adoption of the "gas unit" induced them to investigate relative costs. Undoubtedly it had helped salesmen in combating talk put forward by the electricity people.

We discussed the question of the "gas unit" in these columns on July 11 last, and suggested that the time was ripe for a definite recommendation by the National Gas Council for or against the adoption of a small unit in Great Britain. We also expressed the view that a unit of 3,412 B.Th.U. is preferable to one of 4,000 B.Th.U. Naturally we think the Australian Gas Industry well advised in adopting a unit of 3,412 B.Th.U., but we do not like the suggestion of the Gas Companies' Association of Australia that it should be called the "Therm." The British Therm of 100,000 B.Th.U. has been a legal instrument since 1920, and confusion is bound to arise if the Australians say that the therm is 3,412 B.Th.U.

Domestic Heating

When the hard-worked officers on the distribution side of gas undertakings return from the summer vacation the next heating season will demand immediate attention, for plans should be laid well in advance. There is still almost limitless opportunity for the displacement of raw coal by gas on the domestic hearth, but, in spite of all the well-known advantages of a smokeless and labourless fuel, in too many cases the decision must perforce be based upon actual out-of-pocket expenditure. To meet such cases, the price must be competitive. We agree with Mr. J. T. Haynes, Engineer and General Manager of the Rotherham Corporation Gas Department, that householders are only too ready to use more and more gas for heating purposes, provided they can obtain the extra gas at competitive prices.

Following upon a comprehensive test, the Rotherham Corporation Gas Committee have put into operation a two-part tariff system of charging for domestic gas, and Mr. Haynes reports that already many consumers are using gas completely in place of coal, with advantage to themselves and to the Department. For the past financial year the use of gas for domestic heating at Rotherham shows an increase of 12½ million c.ft. The two-part tariff system which promises to serve the under-

taking so well is similar to the Electricity Committee's rateable value system; and under such a scheme it is possible for the extra gas to be supplied at competitive prices.

The Motorist and the Lamp

GLANCING again at Mr. Haynes's report for the past financial year, we note that the Rotherham Corporation have approved in principle a scheme for improving the illumination of the chief roads and streets of the town. As the use of the thoroughfares increases, so other things must be increased proportionately—or, if possible, more than proportionately. In the case of Rotherham the raising of the street lighting to comply with a higher classification in the British Standard Specification is doubtless simplified by the fact that the gas required for this public service is supplied free, as a contribution to the rates, but even where it has to be paid for in the usual manner, and not by one section of the community, the best practicable public lighting should be considered an essential to present-day traffic conditions. A uniformly well-lighted road must be safer than a dark or patchy one.

But in addition to enabling the motorist and the pedestrian to dodge one another more successfully, the public lamp has other uses, and one of these uses has been to inform the wayfarer of names of streets by means of small slides across the glass sides of the lantern. The motorist, however, finds little opportunity to pause and decipher this small wording, and one wonders whether something bigger could be devised so as to catch the eye of drivers. Already many private houses, at all events in rural areas, are experiencing the necessity of displaying over the pathway miniature sign-boards announcing the designation of the residences. This is an extension, for the benefit of the motorist (the pedestrian can glance at the gate), of a custom which has hitherto been associated chiefly with the innkeeper, the barber who once thrust out a pole, and the unlimited free advertising permitted to the house agent. But it is a very convenient extension, and we should like consideration to be given to the question of whether still further usefulness can be added to the street lamp as a dispenser of information. There is no desire to propose here anything intended merely to facilitate "speeding up," as good street lighting is sometimes thought to do; the idea is solely to afford greater convenience to those driving in dusk or darkness through localities with which they are not familiar. The difficulty is one which has often faced railway travellers when stopping during the hours of night at stations strange to them. Perhaps public lighting authorities will see what can be done.

In another direction the importance of the public lamp in relation to the motorist was emphasized in the House of Lords a few days ago, during the report stage of the Road Traffic Bill. On that occasion Lord De Clifford pointed out that there are many towns and villages where street lamps are not lit at certain periods of the year, and others where the lights are extinguished at stated hours—a point to which the "JOURNAL" called attention when discussing the Bill not long ago. Accordingly he moved an amendment to provide that a person should not be deemed to have acted during the hours of darkness in contravention of the speed limit sub-section, if he proved that the lamps by which a system of street lighting was furnished were not alight at the time the offence was alleged to have been committed. This amendment was withdrawn upon an assurance being given that the Government would take an early opportunity of calling the attention of local authorities to the matter, and would suggest the procedure which authorities in the circumstances referred to should consider adopting. The point requires attention, as touching upon a subject of importance.

Licences for Goods Vehicles

THE concern which has been evident throughout the Nation in recent years as to the desperate position of the railways which had for so long been universally regarded as one of the Nation's primary assets, found Parliamentary expression in last year's Road and Rail Traffic Act.

The primary purpose of the Act was, of course, to restrict in some measure undue, if not unfair, competition between railway and road transport. Opinions may have differed as to what measures should be taken to solve an extremely complicated problem. Some, for instance, would have sought a solution by relieving the railways of certain restrictions placed upon them by antiquated legislation, while other cures were suggested of varying degrees of severity. Parliament, however, in its wisdom, chose a middle course. It gave the railways greater freedom with regard to charging, and at the same time imposed upon road traffic a system of restrictive licensing. These measures were embodied in the Act which we have named, under which goods vehicles, with certain exceptions, require, according to circumstances, one of three forms of licence.

This system of licensing is our reason for referring in these columns to the Act, since under modern conditions gas undertakings are among the larger users of road transport. It is perhaps too much to expect any Act of Parliament to be so simple that "he who runs may read." The Road and Rail Traffic Act, 1933, does not pretend to be light reading, and it is hardly surprising that a large number of gas engineers and managers are inquiring as to the exact obligations which the Act imposes upon their undertakings. On another page of this issue we have endeavoured to elucidate for them those parts of the Act which are likely to be of direct concern to the Gas Industry.

Reliability and Unfair Treatment

THE serious breakdown of the electrical grid to which reference was made in last week's "JOURNAL" has not unnaturally caused widespread misgivings. The Glasgow *Evening Citizen* doubts whether the great electricity scheme has been worth the money spent on it when trouble at a single generating station can result in dislocation throughout 12,000 square miles of country with a population of 13,500,000. The Gas Industry has never had any doubt at all about this.

The breakdown prompted Dr. Charles Carpenter, President of the South Metropolitan Gas Company, to appeal through the columns of *The Times* that a more liberal outlook on the part of "officialdom" towards the gas undertakings of the country should supersede the one-sided attitude which has been increasingly obvious since the putting into operation of the grid. Dr. Carpenter points out that deliberately to abolish gas for street lighting, not because it is inefficient, but because it is gas, is an unsound procedure from any point of view, and not least the safety of pedestrians and motorists alike; and he cites an example of the type of treatment meted out to the Gas Industry. Recently a body decided to replace gas by electricity in 6½ miles of its roads without giving the gas company the oppor-

tunity to modernize its provisions as it did when incandescent burners were substituted for the old flat-flame ones. How can gas possibly compete with electricity under such conditions?

Dr. Carpenter has done good service to the Gas Industry by his letter to *The Times*. We reprint his appeal on a later page.

Public Lighting

WHILE writing of public lighting, too much stress cannot be laid on the importance of association with the national organizations which are particularly interested in the subject. Is the representation of gas in the Illuminating Engineering Society and the Association of Public Lighting Engineers adequate, and, if not, what can be done about it?

We understand that the question has recently been raised among the District and the Junior Associations, and we urge them to take all possible steps to see that the Gas Industry derives every available benefit from these lighting organizations, as our electrical friends are doing in these days. Apart from this, individual members of the Industry must see what part they can play.

Our list of "Forthcoming Engagements" has lately contained the dates of the eleventh Annual Meeting of the Association of Public Lighting Engineers—Sept. 17 to 20 in Aberdeen. It is good news that three members of the Gas Industry are attending as official representatives of the Institution of Gas Engineers. But this is not enough. The Council of the Association has invited members of the Institution to attend the Conference, and it is to be hoped that many representatives of our Industry will investigate the possibilities of going to Aberdeen for the occasion. Why not, in any case, write at once to Mr. J. Stewart Dow, of 32, Victoria Street, S.W. 1, for particulars of membership of both the Illuminating Engineering Society and the Association of Public Lighting Engineers? It can do no harm.

It is never in question that public lighting is of vital importance to the Gas Industry. Apart from the value of the load, it is, if it is really efficient and up to date, a nightly reminder of gas service. The A.P.L.E., to whose September Conference we have referred above, is a body which has developed intense interest in the subject, and to whose Conferences lighting authorities are sending delegates in annually increasing numbers. The Association presents an annual survey of the improvements and additions throughout Great Britain and Ireland, as far as it is possible to obtain and publish the information from the various sources. It is interested, moreover, in the development of public lighting on sound economic lines, and without regard to the source of power to be used, and it is from this point of view that the Gas Industry must be alive to the desirability, and even the necessity, of taking a lively part in its proceedings, and actively participating in the whole of its work, which is to comprise the education and training of men for the practical work of public lighting engineers, in addition to keeping up to date their knowledge of all matters connected with the profession. Members of the electrical industry are appreciating this necessity to the full from their point of view.

Many towns cannot employ a full-time public lighting engineer, and in many cases the work falls upon gas engineers, and it is to those so situated that the appeal to join this body should come with full force. Many, if not most, gas engineers are indirectly connected with public lighting, and to them the appeal should be no less forcible. All gas engineers should think and act in this matter without delay, and so dispel assertions that as a body they are not intensely interested in public lighting and the work of the local authorities who are controlling this business.

Training for Business

JUST twelve months ago reference was made in the "JOURNAL" to the fact that the Department of Business Administration at the London School of Economics were starting upon an important development in the recruiting of trained men for business, with the backing of nationally known firms, and it is a pleasure to record in our news columns to-day that its success during the past year has led to the continuance and extension of the scheme. This summer a number of prominent business organizations are offering about a dozen appointments to university graduates selected by them and approved by the Department, on condition that they attend the Department's special course of business training during the coming academic year (from October to June). Applications are already being received for admission to this course, and any of our readers who may be interested in the proposal should put themselves in communication with Mr. Jules Menken, the Head of the Department, at 11, Clement's Inn Passage, London, W.C. 2.

The object of this University Scheme of the London School of Economics is to overcome some of the difficulties which in the past have hampered the training of future executives in business principles and methods, and as a bridge between business and the universities it has been deservedly welcomed by a number of industries. On the one hand, candidates under the scheme must be university graduates who have just taken their degrees, and their personal qualifications must be high. On the other hand, this University Scheme may be said to offer the right man a valuable opportunity.

Forthcoming Engagements.

Aug. 14.—IRISH ASSOCIATION.—Annual Meeting in Belfast.
Sept. 1-4.—SECOND INTERNATIONAL GAS CONFERENCE, Zurich.
Sept. 6.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Annual Meeting in Inverness.
Sept. 11.—I.G.E.—Finance Sub-Committee, 9.45 a.m.; Membership Sub-Committee, 10.30 a.m.; General Purposes Committee, 11.15 a.m.; Gas Education Executive Committee, 4 p.m.
Sept. 17-20.—ASSOCIATION OF PUBLIC LIGHTING ENGINEERS.—Eleventh Annual Meeting at Aberdeen.
Sept. 20.—I.G.E.—Refractory Materials Joint Sub-Committee (Stoke-on-Trent), 2.30 p.m.
Sept. 20.—WALES AND MONMOUTHSHIRE ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—General Meeting at Porthcawl.
Sept. 24-26.—B.C.G.A.—Annual General Meeting and Conference at Sheffield.
Sept. 27.—I.G.E.—Liquor Effluents and Ammonia Sub-Committee, 2.30 p.m.
Sept. 28.—I.G.E.—Joint Research Committee, 10.30 a.m.; General Research Committee, 2.30 p.m.
Nov. 6 and 7.—I.G.E.—Autumn Research Meeting.

There will be no meeting of the Central Executive Board of the National Gas Council or of the Central Committee of the Federation of Gas Employers during the month of August.

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Page 12. BRITISH GAS LIGHT. A. L. Higham transferred from King's Lynn to Norwich.
Page 14. BURNLEY. A. F. Ames appointed E. & M. vice J. H. Clegg resigned.
Page 20. DARWEN. A. F. Ames, E. & M., resigned.

Personal

BURNLEY'S NEW ENGINEER.

Mr. ARTHUR FREDERICK AMES, M.Inst.C.E., who has been Engineer and Manager of the Corporation gas undertaking at Darwen, has been appointed Gas Engineer and Manager at Burnley to succeed Mr. J. Herbert Clegg, who had secured a similar appointment under the Southport Corporation. There were originally 37 applicants for the post, and Mr. Ames will probably commence his duties at Burnley at the end of September. Mr. Ames was Assistant Engineer and Manager at Oswaldtwistle from 1908 to 1916; the next two years he was at Silsden, and then went to Padiham as Manager, leaving in 1924 to become Manager at Oswaldtwistle. He remained there until 1931 when he secured the Darwen appointment.

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Sir FRANCIS GOODENOUGH underwent a slight operation in a London nursing home on July 31 for the removal of a stone which was the cause of his illness. His condition is entirely satisfactory and he will leave London at the week-end for a further course of the waters at Llandrindod Wells which, we are very glad to learn, is expected to put the finishing touch to his recovery.

* * *

The appointment is announced of Mr. BRIAN F. WOOD, elder son of Mr. F. F. Wood (Secretary of the Croydon Gas Company), as Assistant Secretary of the Gas Light and Coke Company. The Croydon Company's Co-Partnership Magazine for July records with pleasure the culmination of Mr. Wood's past successes in such a responsible position in the largest gas company in the world.

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At Mount Pleasant Church, Oswaldtwistle, on Aug. 3, Mr. DOUGLAS J. COLVIN, son of Mr. R. Colvin, of London, was married to Miss Eunice Wignall, daughter of Mr. and Mrs. J. Wignall, of Oswaldtwistle. The bridegroom is Gas Engineer and Manager at Oswaldtwistle.

* * *

The British Gas Light Company, Ltd., announce that Mr. A. L. HIGHAM, the Engineer and Manager of their King's Lynn Undertaking, has been appointed to succeed Mr. C. R. Armitage as Engineer and Manager of the Company's Norwich Station. Mr. Higham will take up his duties at Norwich on Oct. 1.

* * *

Rotarians connected with the Gas Industry will be interested to learn that several of their confrères figure in the list of the new Presidents of Rotary Clubs throughout the country for 1934-35. We learn that Mr. L. G. HUMPHRYS is the new President of the Rotary Club at Bexhill; Mr. J. J. PATERSON at Dover; Mr. WILLIAM HAWKYARD at Edmonton; Mr. T. BRAITHWAITE at Ilford; Mr. STUART WATSON at St. Pancras; and Mr. ERNEST ABLETT at Swansea.

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The Council of the Institution of Gas Engineers has nominated three representatives to attend the annual meeting of the Association of Public Lighting Engineers, Aberdeen, Sept. 17-20—Mr. S. MILNE, of Aberdeen, Mr. LEWIS BAIN, of Banff, and Mr. J. WILSON, of Dundee.

* * *

Mr. R. WATSON, Engineer and General Manager to the Doncaster Corporation Gas Department, is to retire on September 30. The Town Council, on Aug. 1, approved the appointment of Mr. D. T. LIVESEY, Works Manager and Assistant Engineer during the past eight years, to become Engineer and Manager, at a salary commencing at £700 per annum. Mr. Livesey was born at the Aldershot Gas-Works, apprenticed to mechanical engineering at Bolton, and subsequently received his gas technical training under his father, who was Engineer, Manager, and Secretary of the East Grinstead Gas Company, and Mr. Andrew Dougall, the first President of the Institution of Gas Engineers. Before going to Doncaster he had two years as Works Chemist at the Harrow and Stanmore Gas Works, and was six years Assistant Engineer and Manager to the Stretford Gas Company and the Gas Board which succeeded it. While in Lancashire he was Hon. Treasurer of the Manchester Junior Gas Association. For the past four years he has been Hon. Secretary of Doncaster Scientific Society.

Correspondence

Another Questionnaire

SIR,—A Questionnaire on "Liquor Effluents and Ammonia" has been prepared by the Liquor Effluents and Ammonia Sub-Committee of the Institution of Gas Engineers, the Sub-Committee considering that a stage in its work has been reached at which data in accordance with the Questionnaire would be valuable.

Engineers and Managers of Gas Undertakings and others interested who could assist the Sub-Committee in its work are invited to obtain a copy of the Questionnaire from the Secretary of the Institution, 28, Grosvenor Gardens, London, S.W. 1.

Yours, &c.,
CHARLES F. BOTLEY,
Chairman, Liquor Effluents and Ammonia Sub-Committee.

28, *Grosvenor Gardens, S.W.* 1,
Aug. 2, 1934.

News In Brief

Institution of Civil Engineers.—We acknowledge receipt from the Institution of a list of members, with addresses corrected to July 2, 1934.

The Post of Gas-Works Superintendent is vacant at Doncaster, and applications are invited from persons under 45 years of age to fill this position, which bears a salary of £350 per annum.

A Dividend of 5% was declared at the annual meeting of the Auchterarder Gas Light Company, Ltd., on Aug. 2. The reports and accounts were approved, a gratifying credit balance being shown.

The Inverness Town Council is to entertain officially the members of the North British Association of Gas Managers when they hold their Annual Meeting in Inverness on Thursday, Sept. 6. Arrangements have been made for a Reception and Dance in the Northern Meeting Rooms that evening.

Accidents in Irish Gas-Works, according to the report of the working of the Factory Workshops Act in the Irish Free State for the year 1933 just issued by the Department of Industry and Commerce, amounted to only 30 of the 875 accidents registered during the year. Most of the accidents were due to persons falling or being struck by a falling body. No gas concern appears in the list of prosecutions for the year.

A Five Years' Contract for the public lighting throughout the whole of their area of supply has been obtained by the Wellington (Salop) Gas Company in competition with electricity. This makes a total of over 700 lamps.

At a Sale by Tender of £10,000 4½% irredeemable preference stock in the Haywards Heath District Gas Company, at a minimum price of £107 per £100 (the stock ranking for dividend as from Sept. 1 next), the amount was three times oversubscribed. The highest tender was £112 and the lowest accepted £108 1s.

East Surrey Dividends, as resolved at a meeting of the Directors held on Aug. 1, will be paid for the half-year ended June 30 last at the following rates per annum respectively: 6% on the cumulative preference; 4½% on the redeemable preference; 5½% on the preference "A"; and 6% on the ordinary "B" stock—all less income-tax.

Capital Expenditure amounting to £5,135 is recommended by the Wallasey Corporation Gas Committee to be incurred early in 1935, on the laying of a new 10-in. diameter cast-iron high-pressure main from Wallasey Village to connect direct into the existing main at Reeds Lane corner together with the provision of a high-pressure governor. Application is to be made to the Minister of Health for sanction to borrow the sum of £10,000 to cover capital expenditure in respect of gas mains and services.

An Interim Dividend of 3½%, *less* income-tax, has been declared by the Directors of the Derby Gas Light and Coke Company on the ordinary stock, for the half-year ended June 30, 1934, which is the same as last year.

An Electricity Breakdown affected Otley, Pool, Arthington, part of Guiseley, and the greater part of the Wharfedale area for some time on the evening of Aug. 3. Street lighting as well as interior services were affected.

A Correction.—In the "JOURNAL" for July 11, p. 107, we stated that the calorific value of Falkirk's gas supply for the year ended May 15, 1934, was 423·5 B.Th.U. The figure should have been 432·9 B.Th.U., the declared calorific make being 430 B.Th.U.

State Aid for Gas in Czecho-Slovakia.—It is reported from Prague that a Bill has recently been introduced in the Czecho-Slovakian Parliament with the object of giving encouragement and financial support to gas undertakings owned by the State or local authorities in the country or of private concerns in which municipal authorities are interested to the extent of at least 50%.

Warrington and Showroom Success.—Alderman John Wood, Chairman of the Warrington Corporation Gas Committee, reports that the new showrooms are proving a great asset. Sales of appliances show an increase of more than 2,000 during the year. Many of the meters in the district required replacement and a good portion of this work will be dealt with during the current year. The unaccounted-for gas amounts to 5·5%.

A Competition is Being Organized by the Société pour le Developpement de l'Industrie du Gaz en France, of Paris, among French manufacturers for the most approved standard form of gas cooking stove to be sold only through gas supply undertakings. While certain requirements are stipulated for the new stove, the methods of meeting these and the exterior design of the stove are being left to the individual manufacturers who take part in the competition.

Re-Organization of the Selling Side is to be undertaken by the Penrith Gas Department following a report prepared by Mr. John Corrigan (Engineer and Manager). The scheme comprises: (1) The establishment of new central showrooms; (2) the transfer from the Town Hall to the new gas showrooms of the collection of all money—including rentals, residuals, and fittings accounts; and (3) the adoption of the continuous billing system. The new showroom premises are situated in the main street of Penrith and comprise a floor area of 110 ft. by 20 ft.

Reduced Charges for Gas have been introduced by the Spenborough Urban District Council as follows: For trade lighting and domestic purposes, for first 18 therms no change; beyond 18 therms, reduction of 2d. per therm. For power purposes, reduction of 1d. on all consumption, the first 450 therms to be charged at 7d. per therm and the scale to operate progressively. For fish frying, sugar boiling, vat heating, &c., at power rates with discount increased to 25%. Domestic and trade lighting new charges operate from meter readings after October; the other changes from the meter readings after Aug. 1.

Prejudice in Favour of Novelty would seem to be the only possible explanation of a two-to-one decision by the Settle (Yorkshire) local Council, last week, to substitute electricity for gas in the street lighting. Notwithstanding a plea to the Council to stand by the Settle Gas Company, in which the bulk of the shareholders are local people, and the fact that the Gas Company's tender was £190 per year, including maintenance, the Council accepted a tender by the Electricity Company at £230 per annum on a three years' contract. The Electricity Company's only alternative suggestion was an annual charge of £180 provided the local Council contributed £450 towards the capital cost of conversion. The Settle Gas Company, it was admitted in debate, had given consistent service for many years past.

Centenary at Houghton-le-Spring.—At the luncheon given by the Houghton-le-Spring District Gas Company in the Bay Horse Hotel, Houghton-le-Spring, on Wednesday, July 4, 1934, Mr. Henry Woodall, J.P., Director of the Company, stated that the staff and employees should receive an additional week's wages to celebrate in their own fashion. The result was that the employees, with their wives and families, spent a very enjoyable day at Edinburgh on August Bank Holiday. During the ten hours in the City the party visited numerous places of interest, including Holyrood Palace, Edinburgh Castle, and King David's Tower. A vote of thanks was passed to the Chairman, Mr. Wm. A. Surridge, and Directors for the gift which made the outing possible. The arrangements were carried out by Messrs. J. Tindale (Foreman), W. Stephenson, and H. Suthern.

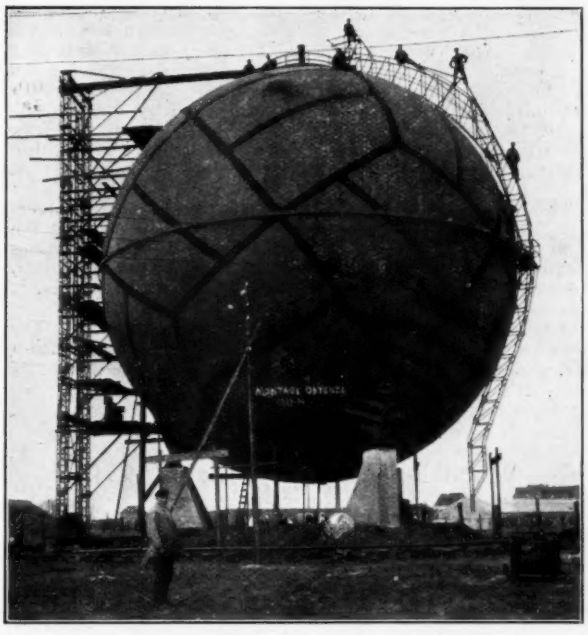
Tillicoultry to Have Gas Lighting.—The Tillicoultry Town Council has agreed to accept the offer of Alloa Gas Department for the public lighting of the streets.

The Lowest Price for Gas in the history of the undertaking has been reached by the Buckhaven and Leven Gas Commissioners in their latest reduction by 2d. to 3s. 9d. per 1,000 c.ft.

The Tender of the Leamington Priors Gas Company for public lighting of Radford Samele was accepted at a parish council meeting. It is expected that the lamps will be installed very shortly.

Ostend's Spherical Gasholder.

In a recent issue ("JOURNAL" for July 18) we briefly referred to the new spherical gasholder which is being built by F. A. Neumann, of the Fabrik fur Eisenkonstruktionen, of Eschweiler, Germany, at the Gas-Works at Ostend. We are now able to reproduce a photograph of the new holder taken during the course of its construction. The structure



has a diameter of 61½ ft. and has been designed to contain 706,000 c.ft. of gas at a pressure of 6 atmospheres. The spherical holder rests on three equi-spaced supports each of which, owing to the nature of the ground, is mounted on three ferro-concrete poles driven into the earth to a depth of nearly 46 ft.

A feature of the new holder is the provision of a sort of semi-circular shaped ladder with guard rails, supported from a turntable at the summit in such a way that the ladder can be rotated right round the spherical holder, enabling the entire exterior surface of the latter to be reached for painting and other maintenance purposes.

Middlesbrough's New Holder.

The Middlesbrough Town Council at a special meeting considered a reply by the Ministry of Health to representations by the Council and a deputation that they should be allowed to accept the tender of Messrs. Ashmore, Benson, Pease, & Co., Ltd.—a local firm—for the erection of a new gasholder on the ground that more work would be provided locally. The Ministry considered there was not sufficient justification to refuse the lowest tender, that of Messrs. Clayton, Son, & Co., Ltd., of Leeds.

After a lengthy discussion the Council agreed to the Ministry's decision and accepted Messrs. Clayton's tender. It was stated that Messrs. Clayton will obtain all their materials from the South Durham Steel and Iron Company and engage the whole of the erection labour locally with the exception of the necessary key men.

Alderman S. A. Sadler, Chairman of the Gas Committee, said he would fight any suggestion for an increase in gas charges, as the Gas Department was going ahead because of its very low charges.

Further News Items will be found on succeeding pages.

Sir Arthur Duckham Memorial Fund.

Official List of Donations from July 28 to Aug. 3.

Name and Town.	Amount. £ s. d.
Cambridge University and Town Gas Light Company	20 0 0
Donations (1) paid above	20 0 0
Donations (625) paid previously ...	£10,514 3 8
Total Donations (626) paid	£10,534 3 8
Donations (2) promised	59 0 0
Total Donations (628) paid or promised ...	£10,593 3 8

Training for Business.

Appointments Offered.

Last summer the Department of Business Administration at the London School of Economics started an important development in the recruiting of trained men for business with the backing of nationally known firms. Its success during the past year has led to its continuance and extension. This summer a number of outstanding firms are offering about a dozen appointments to university graduates selected by them and approved by the Department on condition that they attend the Department's special course of business training during the coming academic year, which opens next October and ends in June, 1935.

This arrangement is known as the Department's University Scheme. It has been devised to overcome some of the difficulties which in the past have hampered the training of future executives in business principles and methods. As a new bridge between business and the universities, it has been welcomed by many firms in many trades.

Applications are now being received for admission to the next course. Further information may be obtained from Mr. Jules Menken, the Head of the Department, at 11, Clement's Inn Passage, W.C. 2.

Woodall-Duckham Work in 1934.

Some Important Contracts.

During the first six months of this year a number of important contracts were received by the Woodall-Duckham Company and their overseas associates for installations of "W.-D." continuous vertical retorts.

The Liverpool Gas Company have ordered an installation comprising a bench of sixteen 82-in. retorts with a carbonizing capacity of 153 tons of coal a day. The plant, which will be housed in a new retort house and provided with coal and coke handling equipment, will include breeze-burning producers, and the waste heat will be recovered in a "W.-D." waste-heat boiler. This new installation will be the third bench of "W.-D." retorts to be erected at Liverpool.

A bench of ten 62-in. retorts, with breeze-burning producers and a waste-heat boiler, has been ordered by the Borough of Stourbridge Gas Department. This plant, which is also the third installation to be erected at Stourbridge, will have a capacity of 63 tons of coal a day. It will be erected in an existing retort house, which is to be extended for the purpose. The existing coal-handling plant will also be extended and coke handling and screening plant will be installed. The screening plant will include a "W.-D." "Undulo" screen, a recent innovation by this Company.

The Exmouth Gas Company have ordered a bench of eight 53-in. retorts with breeze-burning producers and complete coal and coke handling and coke screening and storage plants. Here again an "Undulo" screen will be provided. The retorts will be capable of carbonizing 47·5 tons of coal a day.

An interesting example of modernization in a small works—one of the most welcome tendencies of the times—is afforded by the installation of a plant comprising three 44-in. retorts which is being carried out for the Burgess Hill and St. John's Common Gas Company. This plant will have a capacity of 10·5 tons of coal a day.

Overseas Orders.

The Compagnie Generale de Construction de Fours reports that two orders have been received for "W.-D." continuous vertical retorts, one comprising a large bench of thirty 103-in. retorts which is to be erected for the Rome Gas Company and will be capable of carbonizing 304 tons of coal a day. The other order is for an installation of four 53-in. retorts to be erected at Tunis. This will be the fourth installation at Tunis, and it will be capable of carbonizing 20 tons of coal a day.

Modernization and major repair work is being carried out on "W.-D." continuous vertical retort installations at Bolton, Wallasey, Birmingham, Manchester, Rochdale, Harrogate, and Smethwick among other places.

In addition to the waste-heat boilers to be installed on contracts mentioned above, the Company have received orders for similar boilers from the Spalding Urban District Gas Department and from the Borough of Newark Gas Department. The former is a natural-draught boiler working in conjunction with a "W.-D." vertical retort bench. The latter is an induced draught boiler working in conjunction with five settings of horizontal retorts.

Apart from the coke handling and screening plants mentioned in connection with the vertical retort contracts at Stourbridge and Exmouth, the Woodall-Duckham Company have received an order for a very complete coke-handling, screening, and storage plants for the County Borough of Smethwick Gas Department and for the County Borough of Wallasey Gas Department.

A T.I.C. tar treatment plant capable of dealing with 10 tons of crude tar per 24 hours has been ordered by the Katoomba Gas Company, New South Wales, while an electrical generating plant has been ordered by the City of Nottingham Gas Department.

New Holder Set in Operation at Portsmouth.

Inauguration Ceremony.

The inauguration of a new District Gasholder at Emsworth Station of the Portsmouth Gas Company took place on Tuesday, July 31.

Mr. T. H. F. Lapthorn, J.P. (the Chairman of the Company), who was accompanied by his colleagues on the Board, in a few introductory remarks, said he welcomed the presence of members and officials of the District Council there that afternoon to witness the effort of the Company to give Emsworth and district an ample supply of gas of good quality and at a cheap price.

The ceremony was performed by Councillor John Lewis, J.P., Chairman of the Urban District Council of Havant and Waterloo, and a Director of the former Emsworth Gas and Coke Company, Ltd., which, for many years prior to the amalgamation of that Company with the Portsmouth Gas Company in 1927, had been responsible for the gas supply of Emsworth. Councillor Lewis said he had had a special desire to participate in the ceremony as it had been his duty to shut down the old gas-works at Emsworth, and there was always an element of sadness about terminating anything which had served a useful purpose for a long time. He then opened the outlet valve of the new gasholder, and, in doing so, wished the Undertaking every success.

In inviting the guests to inspect the holder and governor plant, the Engineer and General Manager (Mr. Thomas Carmichael) thanked the staff for the preparation of the brochure, copies of which had been distributed, giving informative details of the progress made in the Emsworth area and also containing interesting particulars concerning the holder. He went on to pay a high tribute to the Contractors—Messrs. Robert Dempster & Sons, Ltd., of Elland, Yorkshire—who were represented by Mr. W. H. Handley (Managing Director), and said that employment had been found for an average of 20 men daily, most of whom had been drawn from local sources.

A Memento of the Occasion.

After tea had been served, Mr. Lapthorn asked Councillor Lewis to accept, as a memento of the occasion, a suitably inscribed silver salver. Returning thanks for the beautiful gift, Councillor Lewis, in a happy vein, said it was the duty of the Council to take an interest in public utility undertakings, as so much devolved upon them in these matters.

In acknowledging a vote of thanks proposed by Councillor Harvey Dixon, J.P., and supported by Sir Harold Pink (Lord Mayor of Portsmouth), Mr. Lapthorn eulogized the work of Mr. Thomas Carmichael, and stated that when the Emsworth Gas Company was taken over seven years ago there was a condition imposed by the Board of Trade that a certain differential charge for gas would be maintained until Oct. 1, 1937. Parliamentary power was now being sought by the Company for permission to anticipate that date, and they were expecting to receive the Board of Trade Special Order within the new few months, allowing them to reduce the price of gas at both Havant and Emsworth. He could not say definitely when the Order would be received, but, as soon as it came through,

the Directors would give consideration to what reduction was possible.

The new gasholder, which stands on the site of the disused works at Emsworth, is of the spiral-guided type, and has at present a capacity of 1 million c.ft., being fitted with two lifts, with provision for a third to be added when necessity arises. Gas is supplied to the holder from the Hilsea Works of the Company, and is transmitted altogether a distance of nine miles. The sub-contractors for the foundation work were the Ferro-Concrete Construction Company, Ltd., of Derby.

Amalgamation and Grouping.

Severn Valley and Ludlow.

The Severn Valley Gas Corporation announce that they have made an offer to acquire the whole or any part of the preference and ordinary shares of the Ludlow Union Gas Company, Ltd. This offer is recommended for acceptance by the Directors of the latter Company.

New Plant Inaugurated at Stockton.

The new plant at the Stockton Corporation Gas-Works, which has cost £25,000, was inaugurated by the Mayor (Alderman C. W. Allison), who donned overalls and drove a mechanical stoker to one of the new beds of retorts and discharged and then recharged it.

Councillor Joseph Stoddart (Chairman of the Lighting and Power Committee) referred to the growth of the Undertaking since it was taken over from a private company in 1875. To-day, he said, they served Thornaby, Billingham, Yarm, and Eaglescliffe areas, and the total number of consumers was 28,000.

The Mayor of Thornaby (Councillor P. M. Newrick) and the Mayor of Middlesbrough (Councillor A. Cooper) commended the enterprise of the Stockton Corporation, and the Mayor in replying said that in the days when the gas-works made large profits Stockton applied them to the relief of the rates instead of paying off its capital debt, and the result was that to-day interest and redemption upon the gas-works debt represented one shilling of the price of every 1,000 c.ft. of gas sold.

The contractors—Messrs. Gibbons Bros., Ltd., of Dudley—were represented by Mr. Eric Gibbons.

The Light Which Does Not Fail.

As mentioned in the "JOURNAL" last week, an extensive failure of the electrical grid took place on July 29. On the next day Dr. Charles Carpenter, President of the South Metropolitan Gas Company, wrote the following letter which was published in *The Times:*

Yesterday's mishap at the Battersea electric super-station and the resultant interruption over a wide area in the distribution of energy for lighting and other purposes prompt my solicitation of the medium of your columns to appeal (I use the word deliberately) that a more liberal outlook on the part of "officialdom" towards the gas undertakings of the country should supersede the one-sided attitude which has been increasingly obvious since the putting into operation of the grid.

Apparently authoritatively inspired, the suggestion is being sedulously put forward that it is the duty of every citizen to do all in his power to ensure the success of a scheme of electricity supply which has received the benediction of the three great political parties. As a practising civil engineer for close upon half a century, I have been too long associated with that profession to have any illusion that there can be any interruption in the progress of science in, if I may use the words of our charter, "the art of directing the great sources of power in Nature for the use and convenience of man." But deliberately to abolish gas for street lighting, not because it is inefficient, but because it is gas, produced by the distillation of coal and not by its combustion, is surely an unsound procedure from any point of view, and not least the safety of pedestrians and motorists alike.

The Legislature has established the right of every municipal tenant to the use of gas in his dwelling for any lawful purpose, and it was because certain municipal councils and boroughs were using their influence to discountenance in every way the use of gas for domestic purposes and thereby give more work for the super-stations of the grid that the need arose for the Act which affirms that right. Their attitude assumes a more serious aspect when considered in connection with the lighting of the public highways. One body has recently decided to replace gas by electricity in 6½ miles of its roads without giving the gas company, which has faithfully served it and its predecessors for something like a century, the opportunity once again to modernize its provisions as it did when incandescent burners were substituted for the old flat-flame ones. A Governmental Committee, it is true, has been recently appointed to consider the whole matter of public lighting, but its functions will obviously be to consider how the artificial illumination of thoroughfares can be most effectively carried out—not whether gas or electricity should be the medium used.

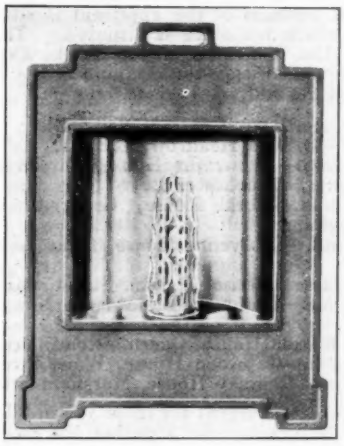
I am well aware of the fact that gas manufacture has been long looked upon as "Cinderella" among the great industries, but although she herself works in an atmosphere of coal and coke dust she performs functions that are of inestimable value to the community in the utilization of those bye-products of coal which are not less essential in time of peace than in war, and in supplying the public with a light that does not fail.

Two New Parkinson Introductions.

The "Paravex" and "Rayvex" Reflector Fires.

Effective room heating depends as much upon the distribution as on the amount of radiant heat.

It is a paradox that the object of room heating is to warm the occupant of the room rather than to heat the room, and when it is desired to use a room for a short period, or when a large room is being occupied by one person only, it is obviously more economical to use a fire which will heat a limited space effectively rather than to heat the entire room. For this purpose the Parkinson Stove Company, Ltd., have introduced their new Reflector Fires, the "Paravex" and the "Rayvex."



The Parkinson "Paravex" Portable Gas Heater.

The "Paravex" and "Rayvex" fires are the exact opposite in principle to the "Curvex" fire in that they concentrate the radiant heat rather than spread it. The "Paravex" fire, which may be either fixed or portable, consists of an upright reflector of parabolic horizontal section, near the focus of which are placed three radiants, back to back, to form a heated pillar. With a reflector of such shape a comparatively narrow beam of radiation extending over a wide vertical angle is directed into the room. This renders it exceedingly suitable for occasional use by one or two people, and it is particularly useful for bedrooms, studies, or kitchens.

The "Rayvex" fire consists of a horizontal reflector of part parabolic vertical section, the heating element of which is a patented all-metal construction in which special alloys are used which are strong and highly resistant to oxidation. The heating element is placed horizontally above the reflector so that tarnishing from this source is eliminated. This fire directs a fairly wide beam of heat over a small vertical angle. The heat distribution of this type ensures that two or three people sitting round such a fire would all receive an equivalent warming effect at a much lower cost than a standard fire.

In both these fires the image of the glowing radiant fills the reflector and magnifies the normal projected radiating surface approximately five times.

The gas consumption in each case is approximately 12-15 c.ft. per hour, which is roughly equivalent to that of a three-radiant gas fire.

It is not claimed that with this amount of heat the entire room is warmed to the same extent as would be obtained with a normal fire, but that the occupants of the room receive an equivalent amount of heat at a much lower cost.

The "Paravex" and "Rayvex" reflector fires are low in price and in gas consumption, but being constructed on scientific lines, they are definitely suited for their specific purpose.

Road and Rail Traffic Act, 1933

A digest of the provisions of particular interest to gas undertakings owning and working motor road transport.

Under the provisions of the Act, goods vehicles, with certain exceptions, will require one of three forms of licence. These licences are as follows:

An "A" licence which is applicable to firms whose sole business is the transportation of other persons' goods.

A "B" licence which permits the holder to carry either his own or other persons' goods for hire or reward.

A "C" licence which is issued to persons who desire to carry only their own goods.

The vast majority of public utility undertakers will be concerned only with "C" licences since the vehicles of such undertakers will be used only for the carriage of their own goods.

The application for a "C" licence is to be made to the Licensing Authority either for the area in which the principal place of business of the applicant is situated or for the area in which his office is situated. The Licensing Authority is the Chairman of the Traffic Commissioners for any traffic area within the meaning of the Road Traffic Act, 1930, and the addresses are as follows:

Northern.—41-45, Grey Street, Newcastle.
Yorkshire.—44, The Headrow, Leeds 1.
North-Western.—Arkwright House, Parsonage Gardens, Deansgate, Manchester 3.
West Midland.—York House, Great Charles Street, Birmingham.
East Midland.—Grosvenor House, Friar Lane, Nottingham.
Eastern.—Sussex House, Hobson Street, Cambridge.
South Wales.—Graham Buildings, Newport Road, Cardiff.
Western.—Brecon House, Queen's Road, Bristol 8.
South-Eastern.—Gaywood House, Wood Street, S.W. 1.
Metropolitan.—Romney House, Marsham Street, S.W. 1.

A "C" licence is current for three years, but short term licences may be granted for a period not exceeding three months for seasonal business, for the execution of a particular piece of work or for any other purpose of limited duration. The fee for a "C" licence for the full currency period is 7s. 6d. per vehicle and for a short term licence 2s. 6d. per vehicle.

Conditions of Licence.

It is a condition for the granting of every licence that—

(*a*) The vehicle shall be maintained in a fit and serviceable condition.

(*b*) Any provisions contained in Acts of Parliament or Statutory Rules and Orders with respect to limits of speed and rate, laden or unladen, and the loading of goods vehicles are complied with.

(*c*) Time for which drivers may remain continuously on duty and the hours which they are to have for rest as specified in Section 19 of the Road Traffic Act, 1930, are observed.

(*d*) That records shall be kept.

It may be useful to say something of each of these conditions.

Condition (a).

The provision of the Road Traffic Act, 1930, that every vehicle must comply with the Regulations, applicable to the class or description of vehicle to which it belongs as to construction, weight and equipment is, of course, primarily the concern of the makers, and the obligation to maintain in a fit condition will give little trouble to public utilities who have always taken a pride in the turn-out of their vehicles.

Condition (b).

Speed limits in respect of certain vehicles are imposed by the First Schedule of the Road Traffic Act, 1930, which imposed upon goods vehicles not exceeding 2½ tons weight unladen and having pneumatic tyres a speed limit of 30 m.p.h. If the weight unladen of the vehicle exceeds 2½ tons the speed limit is 20 m.p.h.

Condition (c).

The Road Traffic Act, 1930, provides that no person may drive for any continuous period of more than 5½ hours or for continuous periods amounting in the aggregate to more than 11 hours in any period of 24 hours commencing two hours after midnight, or so that the driver has not, at least, 10 consecutive hours for rest in any period of 24 hours calculated from the commencement of any period of driving. It is provided by the Act, however, that it shall be sufficient compliance with the provision if the driver has at least 9 consecutive hours of rest in any period of 24 hours, provided that he has an interval of at least 12 consecutive hours for rest in the next following period of 24 hours. In computing these periods 2 or more periods are to be deemed continuous periods unless separated by an interval of at least half an hour during which the driver is able to obtain rest and refreshment. Time spent in loading or repairing the vehicle is to be included in the period of driving.

Condition (d).

The obligation to keep records is the one which will probably be found to be most onerous upon public utilities. The records which it will be necessary to keep are to indicate—

(*a*) Times at which the driver commenced and ceased driving and his period of rest, whether acting as driver or attendant.

(*b*) In the case of each journey the greatest weight of goods carried by the vehicle at any one time during the period to which the record relates and the description and destination of the goods. The form of records is to be in conformity with those laid down in the Regulations to be made by the Minister. The Conjoint Conference of Public Utility Associations has made representations to the Minister that the vehicles of public utilities should be exempted in the Regulations on the ground that such vehicles are used mainly for the transportation of goods for house-to-house deliveries, and that the conditions as to the hours of work of the drivers employed by public utilities are already regulated.

Draft Regulations.

Draft Regulations have already been issued by the Minister which do not provide for any exemption in the case of vehicles of public utility undertakings. These draft Regulations contain the forms in which the records are to be kept. The Regulations, however, provide that if the load carried at any one time does not exceed 2½ tons in weight it shall be sufficient compliance with the Regulations if the entry "not exceeding 2½ tons" is made *in lieu* of the information required to be given in the column headed "Maximum weight at any one time."

The Regulations provide special forms to be used in cases where vehicles are used for collection and/or delivery within 25 miles radius from loading base. In such cases full particulars are not required as to the journey, it being sufficient to enter the name of the district served. It should also be pointed out that it is open to any Licensing Authority to dispense with the observations of the Regulations in respect of any particular vehicle or in respect of the use of vehicles for any particular purpose.

In order to obtain such a dispensation from the Licensing Authority, however, it would be necessary to show that it is not reasonably practicable, having regard to the nature of the business concerned, for the requirement dispensed with to be observed. If, therefore, it is impossible to obtain a general dispensation in respect of public utilities in the Regulations to be made by the Minister, it would still be open to any particular undertaking to apply to the Licensing Authority for dispensation.

A Wet Process for the Removal of Hydrogen Sulphide from Coke Oven Gas

By F. Frank Smith and D. R. Pryde.

[Reprinted by kind permission of the Society of Chemical Industry, from their Journal of July 27, 1934.]

The usual method of removing hydrogen sulphide from coke oven gas is mixing the gas with air and oxidizing the hydrogen sulphide to sulphur by reaction with iron oxide and air in an oxide box. The plant required is simple but the process suffers from the disadvantage that the reactions are relatively slow and hence necessitate a low gas space velocity and a big plant. The alternative method of removing hydrogen sulphide from coke oven gas is by scrubbing with an alkaline liquid. The reaction is very much more rapid and the plant required is much smaller in size, but it is slightly more complicated in detail than an oxide box plant.

There have been two main lines of development of wet purification processes. In the first, advantage has been taken of the acid properties of H_2S and purification has been effected by scrubbing the gas with an alkaline solution. By suitable treatment the alkali and the H_2S may be subsequently regenerated. The second main method which has been developed utilizes the reducing properties of the H_2S. An alkaline scrubbing solution is used which absorbs H_2S and undergoes reduction. Subsequent oxidation regenerates the solution together with sulphur or one of its derivatives, such as ammonium sulphate. A few examples of each type of method will be considered, and then a particular example of the second method will be described in detail.

Removal as H_2S.

The best known example of the general method of removing the hydrogen sulphide from coke oven gas as hydrogen sulphide is the Seaboard process. The gas is scrubbed with a dilute solution of sodium carbonate and the solution subsequently regenerated and hydrogen sulphide evolved by passing air through it. This simple process has two main disadvantages. In the first place not only is the sulphur in the hydrogen sulphide wasted but it is difficult to dispose of the air containing the hydrogen sulphide. It is usually burnt under boilers or oven heating flues or passed through producers or water gas generators. In the second place the whole of the hydrogen sulphide is not removed from the gas.

As long ago as 1880 Claus suggested removing the hydrogen sulphide from coke oven gas by means of scrubbing with ammonia obtained from the gas. He further tried to recover the sulphur from the hydrogen sulphide by distilling the ammoniacal solution of hydrogen sulphide and carbon dioxide and partially burning the evolved hydrogen sulphide and carbon dioxide in a special kiln. The percentage of carbon dioxide was, however, too high for the process to be successful.

A modification of the general method consists in scrubbing out the hydrogen sulphide from coke oven gas by water under pressure. This method will not pay unless it is necessary to compress the gas for some other reason.

Employment of Reducing Properties.

One of the earliest methods of removing hydrogen sulphide from coke oven gas, by making use of its reducing properties, depended on the interaction between hydrogen sulphide and sulphur dioxide,

$$2H_2S + SO_2 = 3S + 2H_2O.$$

Part of the sulphur could be burnt to supply the SO_2 so that the process both removes the hydrogen sulphide from the gas and recovers its sulphur content. Many attempts were made to apply this reaction, but none was successful. Perhaps the neatest method was that due to Feld. The scrubbing liquid was a solution of ammonium tri- and tetra-thionates $(NH_4)_2S_3O_6$ and $(NH_4)_2S_4O_6$. The process was arranged so that the scrubbing liquid was regenerated and the sulphur in the hydrogen sulphide finally obtained as ammonium sulphate. The process, however, is both complicated and sensitive—it will only work well if the ratio of H_2S to NH_3 is 1 to 2.

The Feld process is only one example of numerous processes which aimed at obtaining the sulphur in the hydrogen sulphide as ammonium sulphate. All the processes suffer from the same defects as the Feld process and are complicated and sensitive, and it is now recognized that the best method of recovering the sulphur from the hydrogen sulphide is as sulphur and not as ammonium sulphate.

An interesting process, which is being tried in Germany, depends on the reduction and oxidation of potassium ferricyanide,

$$2K_3Fe(CN)_6 + H_2S + 2K_2CO_3 = 2K_4Fe(CN)_6 + S + 2KHCO_3.$$

The resulting potassium ferrocyanide is oxidized by electrolysis. The gas is scrubbed with a solution of potassium ferricyanide and potassium carbonate and the solution is then allowed to settle. The lower layer containing the sulphur is drawn off and filtered and the remaining solution passed to an oxidation cell in which the original solution is regenerated,

$$2K_4Fe(CN)_6 + 2KHCO_3 = 2K_3Fe(CN)_6 + 2K_2CO_3 + H_2.$$

The process is best adapted for water gas purification, since then the sulphur obtained is pure. When used for coke oven gas purification the sulphur is discoloured with tar.

The Thylox process uses the reduction and oxidation of sodium thioarsenate

$$Na_3AsO_2S_2 + H_2S = Na_3AsOS_3 + H_2O$$
$$Na_3AsOS_3 + O = Na_3AsO_2S_2 + S.$$

After use for scrubbing the solution is subsequently aerated and the sulphur separated by flotation.

The Auto Purification Process.

Interest in liquid processes for removing hydrogen sulphide from coke oven gas and in the use of ammonia as the alkali has been re-stimulated by the decline in the value of ammonia and its products which has occurred in recent years. This decline in value has been sufficient to alter very greatly the economic aspect of ammonia recovery and to make it a charge on the average works rather than a source of profit. This has an important bearing on the economics of liquid purification, since it becomes permissible to use the ammonia in the gas for purification purposes without regard to the loss of alkali in side reactions.

A process has been in use at the Billingham coke ovens of Imperial Chemical Industries during the last two years which uses the ammonia in the coke oven gas as the alkali in a scrubbing solution for removing hydrogen sulphide. The process uses the reduction and oxidation of iron ammonium ferrocyanide.

Ferric ammonium ferrocyanide + H_2S → ferrous ammonium ferrocyanide + S.
Ferrous ammonium ferrocyanide + O_2 → ferric ammonium ferrocyanide.

When a dilute solution of ferrous sulphate is brought into contact with coke oven gas it absorbs ammonia and hydrogen cyanide and becomes an ammoniacal suspension of iron ammonium ferrocyanide. Hydrogen sulphide is removed from coke oven gas by scrubbing with this suspension which is subsequently regenerated by aeration in a tower. The sulphur formed during the removal of the hydrogen sulphide from the gas is separated by flotation during the aeration stage. This straightforward scrubbing process simultaneously removes hydrogen sulphide and hydrogen cyanide and over half of the ammonia from coke oven gas and has been termed the " Auto " process.

The mechanism of the process appears to be somewhat as follows:

(*a*) *Ammonia removal.*—Ammonia removal takes place simply by scrubbing in the same way as in the ordinary ammonia scrubbing process.

(*b*) *HCN removal.*—Hydrogen cyanide in the presence of ammonia, sulphur, and ferrous and ferric iron interacts to give: Ammonium cyanide, thiocyanate, and ferrocyanide, which are soluble, and ammonium ferric and ferrous ferrocyanides, which are insoluble.

(*c*) *H_2S removal.*—Ferric ferrocyanide in the presence of ammonia is reduced by H_2S to ferrous ferrocyanide and sulphur is liberated,

$$Fe_4(FeCy_6)_3 + 2H_2S + 4NH_3 \rightarrow 2Fe_3FeCy_6 + (NH_4)_4FeCy_6 + 2S.$$

Ferrous ferrocyanide is very easily oxidized by air to ferric ferrocyanide, and this is effected when the liquid is regenerated,

$$2Fe_3FeCy_6 + (NH_4)_4FeCy_6 + O_2 \rightarrow Fe_4(FeCy_6)_3 + 4NH_3 + 2H_2O.$$

In addition some sulphur is oxidized to thiosulphate.

If oxidation is incomplete then ferrous sulphide is formed on further exposure to H_2S,

$$Fe_2FeCy_6 + 2H_2S + 4NH_3 \rightarrow 2FeS + (NH_4)_4FeCy_6.$$

Should this stage be reached oxidation becomes more difficult,

$$2FeS + (NH_4)_4FeCy_6 + O_2 \rightarrow Fe_2FeCy_6 + 2S + 4NH_3 + 2H_2O.$$

Under normal running conditions with efficient liquor regeneration, ferrous sulphide is never present in the circulating liquor. The liquor has a characteristic colour varying from green to blue imparted to it by ferric ferrocyanide.

Although in the equations just given the compounds ferrous and ferric ferrocyanides have been mentioned, the actual insoluble complex cyanides which are present are ammonium derivatives of these compounds which are easily decomposed with the evolution of ammonia and cannot be isolated in the pure form.

(*d*) *Composition of the liquors.*—A typical analysis of the circulation liquor is given below:

	%
Free NH_3	0·85
Fixed NH_3	1·72
Total NH_3	2·57
$(NH_4)_2CO_3$	0·48
$(NH_4)_2S_2O_3$	3·95
$(NH_4)_2SO_4$	1·27
NH_4CNS	3·05
NH_4CN	trace
Soluble iron [as $(NH_4)_4FeCy_6$]	0·05
Suspended solids	0·15

The suspended solids consist mainly of ferrous and ferric ammonium ferrocyanide and sulphur, together with a little iron hydroxide or carbonate. Immediately after H_2S absorption iron is present mainly in the ferrous state, while after regeneration it is practically entirely ferric. The concentration of insoluble complex iron is normally about 0·05 g. per 100 ml. liquor, and simple iron (ferrous and ferric) about 0·10 g. per 100 ml.

Description of the Plant.

The plant installed at the Billingham ovens, although of an experimental nature, is sufficiently large to supply the whole of the purified gas requirements of the research laboratories and the canteens. It includes two absorption towers (each of 2,500 c.ft. per hour capacity), pumps for liquor circulation, a regeneration tower with an automatic sulphur removal device, and gas boosters for delivering purified gas.

(*a*) *The absorption towers.*—The absorption towers are 34 ft. high and 6 in. internal diameter. They are packed with a special open type of metal grid. The foul gas entering the base of the tower meets a descending stream of scrubbing liquor, and the following reaction takes place:

$$Fe_4(FeCy_6)_3 + 2H_2S + 4NH_3 \rightarrow 2Fe_2FeCy_6 + (NH_4)_4FeCy_6 + 2S.$$

The sulphur liberated is finely divided and causes extensive foaming in the scrubbing liquor. This foaming is responsible for the greater portion of the pressure drop experienced by the gas in passing through the tower, and is thus an important factor governing the capacity of the tower. The extent of the foaming appears to be roughly proportional to the amount of sulphur liberated, as is shown by the following comparative results obtained with 2,100 c.ft. an hour of gas and 1,000 gallons an hour of liquor passing through the tower.

H_2S in Gas. Pts. per 10^5.	Pressure Drop Through Tower. In. Water.	H_2S per Pressure Drop.
760	15·6	19·5
290	5·0	24·2

The maximum permissible pressure drop on the existing plant is about 12 in. water and it has been found that one tower will purify about 2,500 c.ft. an hour of gas containing 700 parts of $H_2S/10^5$ volume of gas. When the H_2S in the inlet gas is as low as 400 parts/10^5 it is possible to deal with about 4,250 c.ft. an hour of gas.

(*b*) *Liquor regeneration.*—The spent liquor leaving the absorption towers is easily oxidized by air to reform ferric ferrocyanide, and when the oxidation is done in suitable apparatus the sulphur present can be floated off and removed from the system. Several rearrangements of the regeneration system have been made with a view to securing economy in operation. The first arrangement tried consisted of a large tank filled with spent liquor through which compressed air was blown, the sulphur being skimmed off periodically from the top by man handling. This arrangement used an extravagant amount of compressed air, probably due to inadequate contact between the air and liquor, and eventually it was replaced by a system in which the liquor was passed through an injector thereby drawing in a finely atomized stream of atmospheric air. After passing through a long length of pipe to secure sufficient contact time, the mixture passed to a collecting tank, where the sulphur was skimmed off as before. By this means a reduction of nearly 70% was effected in the power requirements of the process.

Attempts which were made to use the air escaping from the collecting tank to atmosphere as a means for automatically carrying away the liberated sulphur only met with success after several modifications had been made to the collecting tank. In the arrangement finally chosen the special type of collecting tank was installed on the top of a 12-in. regeneration tower 60 ft. high. The liquor leaving the absorption towers is pumped up the regeneration tower and flows co-current with a stream of compressed air admitted at the base of the tower. (Aeration could also be effected by means of a suitably-arranged injector.) The aerated mixture passes into the collecting tank at the top of the tower, where the liquor flows into the right-hand compartment through a slotted weir. The level of the liquor in the tank is adjustable by means of an overflow control, and this is arranged so that the level in the central compartment is about 1 in. below the left-hand weir. The air blowing through this compartment passes a baffle arranged to give a slight right to left motion at the surface, and the sulphur foam collecting at the surface flows over the left-hand weir, and after travelling through a fall pipe is collected on a filter arranged below. The method has now been under test for nearly twelve months and has worked well.

A typical set of running results, obtained with one absorption tower working, is given below:

—	Inlet.	Outlet.
H_2S	700	*Nil* to 0·3 part per 10^5
HCN	0·25	0·001 grain per c.ft.
NH_3	1·7	0·6 ,, ,,

The corresponding running conditions were:

Gas rate	2,500 c.ft.
Liquor to absorption tower	440 galls. per hour
Liquor to regeneration tower	440 ,, ,,
Air to regeneration tower	250 c.ft. per hour (at 32 lbs. per sq. in. gauge)
Pressure drop across absorption tower	5·6 in. water
Ferrous sulphate make-up.	20 lbs. per day

Removal of the Last Traces.

Under normal circumstances, operation under the above conditions brings about complete removal of H_2S from the gas, but occasionally a trace of H_2S goes forward with the gas. This indicates a slight partial choke in the absorption tower, resulting in a faulty liquor distribution, and may be brought about by precipitated sulphur or by naphthalene deposited from the gas. Partial chokings due to sulphur usually clear themselves in a short time but naphthalene deposits require washing out with water. On the towers described, they may be avoided by changing over towers once every two or three days and cleaning. On the other hand partial choking due to sulphur cannot be entirely avoided, and where a gas entirely free from H_2S is required, some further treatment is necessary. Experiments on the passage of the gas through a seal of regenerated liquor are giving promising results.

Sulphur Recovery.

About 80% of the sulphur removed from the gas is recovered as elementary sulphur in a very finely divided and reactive form. The remainder is lost as thiosulphate and thiocyanate. The slurry obtained by flotation has the approximate composition:

	%
Sulphur	16·5
Iron	0·5
Ammonium salts, &c.	3·0
Water	80·0

After filtering, washing once with cold water, and drying, a product is obtained consisting roughly of:

	%
Sulphur	90·0
Iron	2·5
Ammonium salts, &c.	7·5

If the drying process is carried out at 150° C., a product consisting of hard compact lumps, suitable for burning for sulphuric acid manufacture, is obtained. This is worth about £2 5s. per ton.

Where a high-grade product is required, purification may be effected by extracting with hot benzene under pressure, filtering hot, and allowing to crystallize. Pure sulphur is obtained in this way, and the residue on the filter, which consists mainly of catalyst, may be returned to the purification plant. In the present state of the sulphur market it is, however, questionable whether this purification would pay.

Estimated Running Cost.

In the table, running costs for a plant purifying 2½

Approximate capital cost of plant . = £5,000
Throughput . . . . . = 2½ million c.ft. per day
H_2S in . . . . . = 700 part per 100,000
H_2S out . . . . . = *Nil* to 0·3 part per 100,000

—	S. per Day.	D. per 1000 C.M.	D. per 1000 C.Ft.
Materials—			
Crude ferrous sulphate 0·388 T. at £1·25	9·68	1·62	0·046
Water	0·17	0·03	0·001
Services—			
Electric power, 0·216 KW.-H. per 1000 c.ft. at 0·75d. per KW.-H.	34·50	5·75	0·161
Process labs.	2·50	0·416	0·012
Process wages, ⅓ man per shift . . .	15·00	2·50	0·071
Supervision.	3·29	0·55	0·016
Repairs and maintenance	20·60	3·44	0·097
	85·74	14·30	0·404
Credit 0.56 T. of 90% S per day at £2 25 per ton, *less* £0·5 per ton for drying. .	19·70	3·28	0·092
	66·04	11·02	0·312
Capital charges at 10% per annum . .	27·4	4·58	0·129
	93·4	15·6	0·44

million c.ft. per day have been estimated from operating data obtained on the experimental plant. This output corresponds roughly to that of a coke oven battery carbonizing 400 tons of coal per day with 50% of its gas used for oven firing and, therefore, unpurified.

The capital cost of an oxide box installation to deal with 2½ million c.ft. day of gas is £8,000. The running costs are about 0·20d./1,000 c.ft. and capital charges at 10% are 0·21d./1,000 c.ft., so that the total costs are about 0·41d./1,000 c.ft.

Summary.

The advantages offered by the "Auto" process over oxide box purification may be summarized as follow:

(1) The capital cost of the plant is less.
(2) The space occupied is considerably less.
(3) The back pressure thrown by the plant is less.
(4) Almost all the HCN is removed from the gas and there is no necessity to add air to the gas. Corrosion troubles should therefore be reduced.
(5) 60% of the ammonia is removed from the gas and one ammonia scrubber may thus be replaced.

The authors wish to express their thanks to the Directors of Imperial Chemical Industries, Fertilizer and Synthetic Products Group, for permission to publish this paper.

French Gas Industry

Review of the 57th Congress of the Union Syndicale de l'Industrie du Gaz en France

(*Continued from p.* 204.)

Properties of Activated Charcoal.

The causes responsible for the deterioration of activated charcoal were discussed by F. Delarozière. The work described was carried out in connection with a setting of steamed Glover-West retorts. A charcoal of vegetable origin was in use. In the case of charcoal employed for the recovery of benzole from gas, deterioration of the charcoal manifests itself by a shortening of the adsorption period and an increase in the number of cycles required per 24 hours.

It is well-known that, in the first few weeks of its use for benzole recovery, the adsorptive power of the charcoal first falls rapidly, and later falls but slowly. It has been found by the author that, if the logarithm of absorptive power is plotted against time, a straight line is obtained.

It is possible to regenerate the charcoal by heat treatment, but a high temperature is required. Treatment with steam at 160° C. effects but slight regeneration, whereas treatment in a lead bath at 360° C. effects good regeneration.

As the absorptive power of the charcoal falls off, the specific gravity of the recovered benzole decreases—*e.g.*, from 0·838 to 0·828 in a season's working. This is accompanied by a reduction of the percentage of the crude benzole distilling up to 100° C. and by an increase in the content of the gum-forming constituents—styrol, coumarone, and indene.

During the course of its deterioration, charcoal suffers an increase in bulk density. This, however, is not due to adsorption of sulphur but to adsorption of gums, &c.

It has been found, though not by a specific reaction, that both the water draining from the pre-adsorber and the coal gas contain formaldehyde, the formaldehyde content of 1 million c.ft. of gas being as much as 4·5 lbs. The formation of resins through interaction of formaldehyde with the tar acids present in the gas is regarded as one of the causes responsible for the deterioration of the charcoal.

Animal charcoal differs from vegetable charcoal in that it does not so readily become charged with gums. It seems to exert an inhibiting action on the formation of gums, possibly in virtue of the basic compounds present in it.

In the operation of benzole recovery plants employing activated charcoal, stress is laid on the utility of pre-adsorbers charged with spent charcoal and on the need for efficient stripping of the main adsorbers after each cycle. For this purpose, steam at a comparatively low temperature suffices. Indeed, a high temperature is disadvantageous.

Oil Filming of Gasholders.

The advantages of oil filming as a means for the prevention of the corrosion of the submerged parts of holders were discussed by V. Goffin. After a review of the characteristics desirable in oils used for this purpose, attention was directed to the means by which loss of oil with the overflow water may be prevented both in the case of the tank as well as in the case of the cups of the lifts. The annual costs incurred when oil filming is practised are but one-half of those incurred in painting. Moreover, the holder is never out of commission when oil filming is employed, whereas the reverse is the case when painting is employed to combat corrosion.

Repairing Leaks in a Holder Bottom.

G. Villiers described the successful application of a Belgian process for sealing leaks in the bottom of a holder in a French gas-works. The process consists in the spraying of a mixture of Portland cement and sawdust into the interior of the holder.

The apparatus employed consists of a 45-gallon drum from the bottom of which passes a pipe connected to a centrifugal pump leading to a length of hose terminating in a swivel pipe and nozzle. The drum, on a movable trolley, is brought alongside the holder. Water, as required, is drawn by means of a syphon from the top of the holder tank for each charge. The drum is filled with water and a mixture of 17·6 lbs. of Portland cement with an equal volume of sawdust is added. The mixture is stirred continuously by hand. The delivery end of the spray pipe is lowered into the holder tank, the swivel joint being then turned so that the spray of cement can be directed upwards into the interior of the holder, the nozzle being above the water level. The following programme was arranged with a view to the use of about 1 ton of cement. Twenty positions, evenly spaced over the periphery of the holder, were selected as spraying stations. At each station, two charges were sprayed in three directions—namely, in a radial direction and at an angle of about 30° on either side of the radius. The work was carried out between 4 a.m. and 8 a.m. each day, when the holder was full of gas. On each day, a double charge was sprayed at each of five stations, hence four days were required to complete the round of 20 stations. After an interval of a few days, a second series of charges was sprayed, a third series being sprayed after a further interval.

The operation is carried out by three men.

To ensure that no air is pumped into the gas in the holder, the contents of the drum are not discharged completely, 4 in. of the slurry being left in the drum after each operation. The whole of the pipework must, for the same reason, be kept full of water. In addition to the internal spraying, it is desirable to pour some of the slurry directly into the holder tank, between the bell and the tank, to ensure that the whole of the base is covered. To prevent the spray pipe from being dropped into the holder tank, the pipe should be attached to the hand rail of the tank by means of a rope. To prevent the formation of sparks, due to friction, the spray pipe should be wrapped with rubber or cloth.

The sealing operation was quite successful.

Dustproofing Coke*

By H. J. Meredith, Koppers Gas and Coke Company, Kearny, N.J.

In the past fifteen years there has been a gradual development of bye-product coke as a domestic fuel coincident with the development of coal gas as a base load for manufactured city gas. The public's appreciation of its merits has been so great that bye-product coke is now recognized as the most efficient solid fuel on the market, and this might encourage producers to conclude that there is no further room for improving its quality. This is contrary to good merchandizing practice, and efforts should always be made to anticipate causes for complaints with the view of correcting them, and making one's product even more acceptable to the consumer. People have come to regard their basements as potential ping-pong rooms, and it is to our advantage to keep coke so clean that a bin full of it will be a worthy and compatible neighbour. Dust, if present, is disagreeable, and many producers believe that it is desirable to dustproof coke in order to satisfy the most discriminating customer. It is, therefore, the purpose of this paper to discuss the various materials which are now available for its accomplishment.

An indeal dustproof agent should allay the dust, be non-corrosive, odourless, smokeless, and inexpensive. It should not freeze, affect the fusion point of the ash, or give off corrosive gases to the products of combustion. Needless to say, nothing has been found to meet all these specifications. There are several materials, however, which are rough on dust, and it remains only for the individual producers to decide which one meets his particular fancy.

These can be classified as follows:

1. Solutions of deliquescent salts.
   - (*a*) Calcium chloride.
   - (*b*) Calcium chloride + magnesium chloride.
2. Oils.
   - (*a*) Heavy petroleum oils containing their own emulsification agents.
   - (*b*) Oils emulsifiable with sodium resinate.
3. Miscellaneous.
   - (*a*) Sulphite liquor.
   - (*b*) Material "D."

The prices quoted in the following descriptions are those prevailing at the time the paper was written and are necessarily subject to change.

1. (*a*) *Calcium Chloride.*

Sold as flakes in paper-lined bags, or as a 40% solution in tank cars. Cost f.o.b. producer's works: Flakes—$19.50 per ton (70-80% $CaCl_2$). Solution—$7.50 per ton (40% $CaCl_2$).

Quantity added: From 1·5 to 2·75 gallons of 17% or 22% $CaCl_2$ solution per ton of coke.

The flake material is convenient for locations where no steam is available or where there is no railroad siding, and if calcium chloride is used, the 40% solution would be chosen on account of its relative cheapness. This solidifies below 70° F., and consequently it is necessary to heat the cars with steam on arrival in order to unload them, unless shipped in insulated cars. It should be diluted immediately to 32%, at which strength it will not freeze above − 25° F.

While calcium chloride has been found to be an excellent dustproofing material, its use has been discontinued by some manufacturers who claim that it lowers the fusion point of the ash, and that it causes excessive corrosion to their coke-handling equipment and truck bodies. When coke treated with it is charged on to a hot fire acid fumes are evolved which are said to increase the normal corrosion of the flue pipes. However, it is still being used at some plants, and one reports that no complaints are received from customers when the quantity added does not exceed 1·5 gallons of 17% solution per ton of coke.

Inhibitors have been tried, especially sodium bichromate, but, so far as we know, nothing has been found which will reduce the corrosion economically to the point where it can be neglected.

1. (*b*) *Calcium Chloride + Magnesium Chloride.*

Cost f.o.b. producer's works, $6.00 per ton.

This material contains approximately 40% calcium chloride, 8·0% magnesium chloride, and 0·02% sodium bichromate, supposedly to prevent corrosion. It is shipped in insulated tank cars, which can be pumped out without further heating on receipt. We are advised that no coke plant is using this material, although it has been used by retail dealers to some extent. It would, judging by the analysis, have all the combined virtues and objectionable characteristics of calcium chloride, and possess no advantage other than price.

2. (*a*) *Oils Containing Their Own Emulsification Agent.*

There are two of these materials on the market, "A" and "B," which are sold by the same company. Oil "A" can be emulsified with cold water, while oil "B" must be heated to about 180° F.

Oil "A."

Cost f.o.b. producer's works—18 cents per gallon in tank cars.

Quantity added: 2 gallons of emulsion (containing 6·25% oil "A") per ton of coke.

Oil "A" is a brown oil distillate containing its own emulsification agent. It is a good dustproofing material, and is commendable on account of the fact that it can be emulsified readily with cold water, and is stable at all temperatures. It will freeze, of course, but the emulsion survives the ordeal. The oil as received will not flow readily below 60° F., and consequently the storage tanks should be insulated and provided with a small heating coil and compressed air for occasional agitation. Its relatively high cost militates against its general use, and this seems to be its main disadvantage, since it is odourless and non-corrosive. It will, of course, like all oils, give off white vapours when coke treated with it is charged on top of a hot fire.

Oil "B."

Cost f.o.b. producer's works—10 cents per gallon in tank cars.

Quantity added: 2 gallons of emulsion (containing 6·25% oil "B") per ton of coke.

This is a petroleum product and has been quite extensively used in the coke industry. It is a black, heavy concentrate, semi-solid at 60° F. and shipped either in drums or in tank cars. Preparation for use is effected by heating it to 180°-200° F. with direct steam, and adding an equal volume of water slowly, accompanied by agitation with the steam. This 1:1 emulsion, if properly made, will have a dark brown colour, and is stable at temperatures above 40° F. It is further diluted as required so that the final emulsion has a water to oil ratio of 15:1. If the producer's instructions are carefully followed, a very satisfactory emulsion can be made.

It is commendable on account of its cheapness. It allays dust considerably, and producers who have used it have noticed an improvement in their product quite commensurate with the cost. Companies which pride themselves on the appearance of their truck bodies, however, complain that the drippings from the loading chutes leave black, oily smudges on them, and offer this complaint as a real menace to its popularity.

It is, of course, non-corrosive and odourless. All pipelines conveying it should be well insulated, and where possible accompanied by companion steam lines, for if the emulsion breaks in the lines it causes stoppage of sprays and a general nuisance all through the system.

2. (*b*) *Oils Emulsifiable with Sodium Resinate.*

Cost f.o.b. producer's works—2.75 cents per lb., including drums.

Quantity required: 0·5 lb. per gallon of oil emulsified.

The introduction of this cheap emulsification agent to the industry makes available a variety of oils which can be bought locally for a price between 6 and 8 cents a gallon.

Sodium resinate is a bye-product of the alkaline pulp industry in West Virginia and North Carolina, and offers very interesting possibilities in the dustproofing field. At least three different oils have been used commercially in conjunction with it. The procedure for emulsifying an 8,000-gallon tank car is as follows:

Dissolve 0·5 × 8,000 = 4,000 lbs. of sodium resinate in 8,000 gallons of water at about 100° F. Warm the oil to the same temperature and pump the two through a common suction line into the main storage tank, or back into the sodium resinate tank, until the tank car is empty. The passage of the oil and solution through the pump is sufficient to emulsify the oil. It is recommended that the tank be agitated by any suitable means (steam or air is satisfactory), and that the contents be re-circulated for

* From a paper before the American Gas Association Joint Committee Conference of the Production and Chemical Committees, New York, May 21-22, 1934.

about an hour or two, or until no oil separates on top of a sample on standing. This emulsion will segregate on standing into a layer of approximately 60:40 emulsion and solution, and mild agitation is required before drawing any off for further dilution to 1:15, or whatever dilution is desired. It is advisable to equip tanks with air, or live steam, for this purpose. The final dilution is made by drawing off the desired amount of 1:1 emulsion and diluting it with water to the required strength. This dilute emulsion will segregate on standing also, but the return from the spraying system is usually sufficient to prevent it. Segregation should not be confused with separation; the supernatant layer is a concentrated emulsion which mixes easily with the lower layer, and not oil.

Three different types of coal spray oils, submitted by three different oil companies, have been emulsified in tank car lots without any difficulty.

The advantage of the sodium resinate emulsions is that they are cheap and effective; non-corrosive, odourless, and do not affect the fusion temperature of the ash, provided, of course, that the right oil is selected.

3. (*a*) *Waste Sulphite Liquor.*

Cost f.o.b. producer's works—7 cents a gallon in tank car lots.

Quantity added: 1·75 gallons of 22% solution per ton of coke.

This is a sticky, molasses-like material recovered from the manufacture of sulphite pulp. It cannot be pumped readily as received below 60° F., and consequently steam is required to warm it up in the winter time. The diluted material freezes around 32° F., and consequently all pipelines conveying it have to be insulated. It is a reasonably good dustproofing agent. It is non-corrosive, and its main virtue is the simplicity with which it can be prepared for use. It dries quickly, and consequently seals in the dust on that part of the coke with which it comes in contact only, so that coverage is an important factor when this material is used.

On combustion it imparts a very disagreeable odour to the flue gases which customers liken to that of burning cabbage. In a sense this might be considered advantageous, since it acts as a warning agent to the consumer, indicating that his furnace is leaking, thereby preventing a possible accident.

3. (*b*) *Material "D."*

This is a mixture of salt, soda ash, and a bye-product of glycerine manufacture. It is used as a water solution with a recommended concentration of 100 lbs. to 35 gallons of water. One gallon of this per ton of coke appears to give fairly good results. It will not freeze above 0° F., and is non-corrosive, but its cost is incompatible with its efficiency, and, as far as we know, no coke plant is using this material at present.

Results of Tests at the Koppers Seaboard Plant.

At Seaboard we have used calcium chloride, waste sulphite liquor, oil "B," oil "A," and sodium resinate emulsions of coal spray oils "G," "S," and "A-1" in the order named, and it is our opinion, at the time of writing, that the relative merit of these materials considering efficiency, corrosion, odour, smoke, price, &c., is in the reverse order. We had definite reasons for abandoning each of the materials tried, and the coal spray oil "A-1" emulsified with sodium resinate seems to be the most satisfactory of them all. We abandoned calcium chloride on account of its corrosiveness, the sulphite liquor on account of its odour and price, oil "B" on account of inefficiency, oil "A" on account of price only, and chose coal spray oil "A-1" emulsified with sodium resinate because a series of dust tests indicated that it was the most efficient, and its cost was relatively low.

The use of 2 gallons per ton of a 1:10 oil emulsion rather than the usual 1:15 is recommended. We have imposed this limit feeling that any more oil would cause excessive smoke. This is equivalent to 0·180 (approx.) gallon of oil per ton of coke.

Dustproofing Equipment.

The equipment required for dustproofing coke is relatively simple, and the following comments are offered only for the benefit of those who anticipate installing it.

(1) *Tanks.*

(*a*) One 20,000-gallon insulated tank provided with direct and indirect steam, two 4-in. openings with a manhole on top, and a 4-in. outlet on the bottom. It is advisable where possible to connect the direct steam line with compressed air to permit agitation without dilution when necessary.

This tank will accommodate one tank car of original dustproofing material diluted as required.

(*b*) Two open top tanks of sufficient capacity for two maximum days, each equipped with direct steam, indirect steam, and air.

(2) *Pumps.*

For gear pumps to deliver a minimum of 50 gallons a minute. These are better than centrifugal pumps for handling the concentrated dustproofing materials on arrival.

(3) *Sprays.*

Hollow cone sprays with the largest opening possible consistent with good atomization, requiring not more than about 40 lbs. pressure to operate. Schutte and Koerting hollow cone atomizing sprays have been found to be very satisfactory and are used in many installations. Wherever convenient it is recommended that the solution be sprayed through two or more sprays in series, rather than through one only, spacing them as far apart as possible to give the coke a chance to turn over between them.

(4) *Pipelines.*

Two-inch circulating lines are recommended. These should be insulated and accompanied by companion steam lines wherever there is a possibility of freezing. It is the general practice to keep the solution re-circulating through these under a pressure of about 40 lbs. per sq. in. maintained by a relief valve on the discharge end. The off-takes to the sprays can be ½ in. or ¾ in. lines, and should be insulated in the same manner as the main line.

(5) *Valves.*

Electrically operated solenoid valves, spring valves, and lever-operated cocks are being used, and the choice depends entirely on the mechanical arrangement of interconnecting the sprays with the coke-loading equipment. It is very desirable that the sprays are opened as soon as the coke starts to flow, so that the same mechanism that starts the coke flowing should also open the sprays. The lever-operated cocks have been found to give the most satisfactory results at Seaboard, where all types have been used in the course of the past few years.

Comments on Dustproofing.

The members of the Carbonization Committee, Messrs. C. R. Locke, A. C. Sedlachek, S. B. Sherman, A. B. Huyck, F. B. Cadmus, F. D. Maurer, and F. J. Pfluke, all contributed to the information from which this paper was written. Their comments on dustproofing resulting from their own experience were as follows:

(1) "Customers note that the coke treated with calcium chloride is somewhat darker in colour than the untreated, and much cleaner both in putting the coke into the cellar and in firing the furnace. Some complaints received are that the treated coke clinkers more easily than the untreated, that shovels and other metal parts that come in contact with the treated coke outside of the furnace show rust spots, and that during the spring and fall when a small fire is carried, a brown liquid condenses in the chimney, and causes an unsightly stain at the joints of the metal flue pipe."

(2) "Each loading chute is fitted with a spray header placed after the Mitchell screen in which are three Brown Junior spray nozzles, spaced at equal intervals across the width of the chute. The nozzles have 3/32-in. orifices, which, with a header pressure of 115 lbs. per sq. in., give a spray which completely covers the cross-section of the chute so that every piece of coke passing over the chute is covered by the chloride spray. The trucks are loaded at the rate of 1 ton per minute and the stream of coke passing over the chute at this rate is very thin, so that every piece receives adequate treatment when using 1½ gallons of 17% solution per ton of coke. The sprays are operated automatically by a lubricated cock the operating arm of which is connected to the operating lever of the coke bin shut-off gate, so that when a truck is loaded the chloride spray starts when the coke gate is opened, and likewise it is shut off when the gate is closed.

"Because our coke is bone dry, due to the dry quenching process, our dust treatment operator must be positive and dependable. The method of application described has been in use over a year, during which time there have been practically no dust complaints. During the winter months when some storage coke which is somewhat wet is mixed with our production an application of 1 gallon per ton is sufficient.

"It may be of some interest to describe our first method of coke treating. The original chloride system was installed to treat the coke on the conveyor belt just ahead of the storage bins. A spray header was installed over the conveyor belt in the coke bins which carries the coke to the screens. In order to ensure that all the coke was

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treated it was necessary to apply 3 gallons per ton of coke. By this method there was considerable waste and some coke received excessive chloride treatment. Some complaints were received because of corrosion of the furnace flue pipe, and we experienced considerable corrosion of our own equipment.

"The coke-treating system as now operated is performing very satisfactorily, and has completely eliminated all dust and corrosion complaints."

(3) "Customers have noticed the difference between treated and untreated coke. We do not have customer complaints on our dust treatment with calcium chloride."

(4) "The consensus of customers' opinions obtained from the sales department indicated that dustproofing with heavy oil 'B' has decidedly improved the quality of the coke. Many customers have commented on the absence of dust during delivery since the installation of the dustproofing system. Some customers have also said that they were in the habit of periodically sprinkling the coke in the bin, but since the company has been dustproofing the coke, this practice has become unnecessary.

"So few dustproofing complaints have been made by customers that it is questionable whether or not they should be mentioned. A very few customers have complained of a 'smudge' being left on their bins by the coke. Other customers have commented on a 'white smoke' which rises in the heater after it has been fired with coke. Investigation has shown that this comment is due more to anxiety than objection. A few of our customers have complained of an odour presumably being thrown off by the dustproofed coke, but, as the investigation of several of these complaints, prior to the dustproofing of coke by our company, showed that this odour was due to causes other than coke, it is questionable whether or not these complaints are justifiable."

(5) "No complaints have been received which were thought to originate from the treatment of the coke with oil 'B.' Dust complaints have been received due to the lack of treatment when for some reason coke went out without being treated."

(6) "Our laboratory conducted comparative burning tests on stove size coke, treated with oil 'B,' and untreated. The only difference noted in the burning properties was that the treated coke produced some smoke immediately after charging. No objectionable odour was noted and the treated coke was noticeably less dusty on handling than the untreated coke.

"Tests of coke deliveries show less than 1 gramme of light dust per ton of treated coke, as compared with 6 to 15 grammes per ton of untreated coke. These results indicate that the treated coke should cause little dust in consumers' homes."

A Home-Made Portable Welder

By H. C. Widlake, Assoc.M.Inst.Gas E., A.M.I.E.E., A.M.I.Mech.E., of the Plymouth and Stonehouse Gas Light and Coke Company.

The portable electric welder is one of the most valuable tools which modern science has placed in the hands of the maintenance engineer. The advantages accruing from the possession of such a plant always turn out to be greater than was anticipated owing to the wide variety of jobs which offer themselves as soon as electric welding becomes an established practice.

A plant may be acquired for certain specific work but before it has been in use very long it will be found that it is being employed for a host of jobs other than those for which it was particularly installed. This is particularly the case on a gas-works where the plant to be maintained comprises a large number of units spread over a wide area —an installation which, by its very nature, furnishes a first-class argument in favour of the portable type of plant.

For some years the author has been making a wide use of electric welding in connection with the repair and maintenance of the various units of gas-works plant, the necessary low voltage current being obtained from a stand-by motor generator set in the works power station. With this equipment the only means for carrying out electric welding *in situ* lay in isolating one of the works feeder circuits for welding service. One particular feeder line lent itself to this purpose, there being no tappings *en route*, and it being possible to transfer its load, when necessary, to another circuit.

This method answered very well; it enabled valuable work to be carried out, but it entailed an undesirable amount of switching under full load and paralleling of feeder lines. It was very desirable that a portable welding set should be acquired, but, having regard to the good work that had been carried out by the then existing method it was difficult to make out a case for the purchase of such a plant, and the possibility of building a set out of such materials as lay to hand was considered.

For some years past the works had been in the throes of a modernization programme, and the electrical stock included several motors and control gear which had passed out of service owing to the demolition of the plant with which they were originally associated. It also happened that the author possessed an old 17·9 Talbot Darracq sports car, which by reason of the shortcomings of its brakes and steering gear had developed into a potential vehicle for the premature transition of its owner to a higher (or, quite possibly, a lower) sphere. This car had an exceptionally strong chassis, and the engine, several years ahead of its actual date so far as design was concerned, was one of those slow revolution, sturdily built jobs which do not develop oval bores after eight or ten thousand miles running. The difficulty of getting any spares for an old model did not arise in this particular instance as an ample stock of spare parts, including a spare engine, went with the car.

An Extended Lease of Life.

A sentimental regard for this old "bus" had kept it out of the hands of the breakers, and, it being admirably suited for the purpose in mind, it was decided to give it an extended lease of life in the form of a portable welding truck. The conversion presented no particular difficulties and was carried through in a simple straightforward manner, thanks to careful drawing board work as the first preliminary.

The first question to be settled concerned the wisdom of using it as a mobile unit capable of travelling about under its own power. It was felt that this characteristic offered very little advantage as ample towage facilities existed for transporting the truck from place to place as required. It was proposed to mount over a ton of electrical equipment on the chassis and, the car itself being somewhat "lively," it was obviously better to draw its teeth so far as travelling under its own power was concerned.

The chief problem of design lay in the provision of a simple mechanical lay-out which would permit of the welding generator being driven by either an electric motor or the existing petrol engine. For the greater part of its time the set was to be used in areas served by 220 volt direct current power lines, and the electric drive was obviously to be preferred under these conditions. For such work as lay beyond the areas served by these power lines the petrol motor offered an easy means for the driving of the generator, always providing that the necessary change-over of the drive could be made expeditiously.

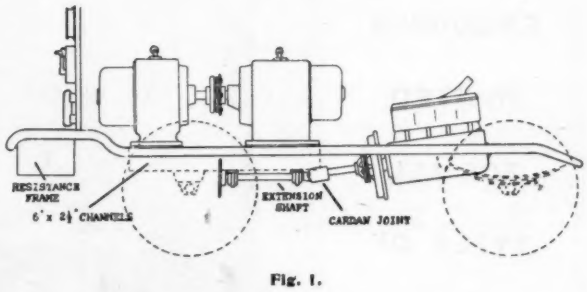
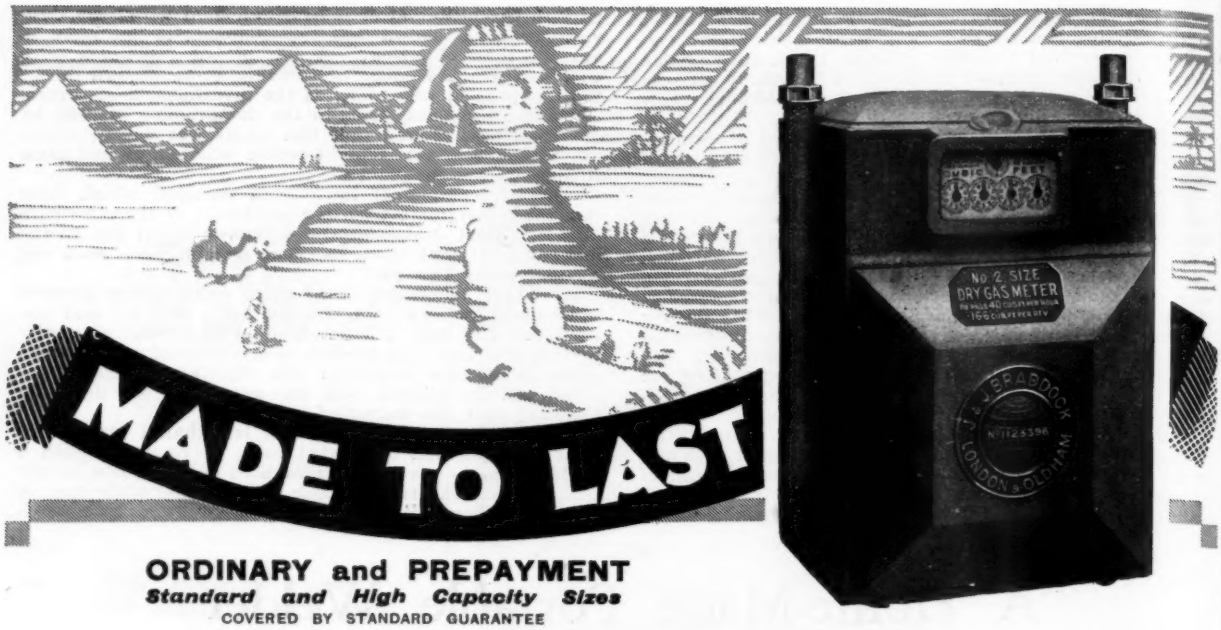


Fig. 1.

The detailed manner in which the conversion was carried out is shown clearly in fig. 1.

Work on Chassis.

The back axle, gear box, and propeller shaft were removed and the side cheeks of the chassis were reinforced for a distance of about 5 ft. by a pair of rivetted-on 6 in. by 2½ in. channel sections. Two ¼ in. steel platforms were rivetted across the top of these channels for the reception of the two units forming the motor generator set, and the underside was fitted with a 2½ in. square section axle with solid rubber tyre. This axle and wheels were once part of an old Ford chain drive conversion and had been laid aside



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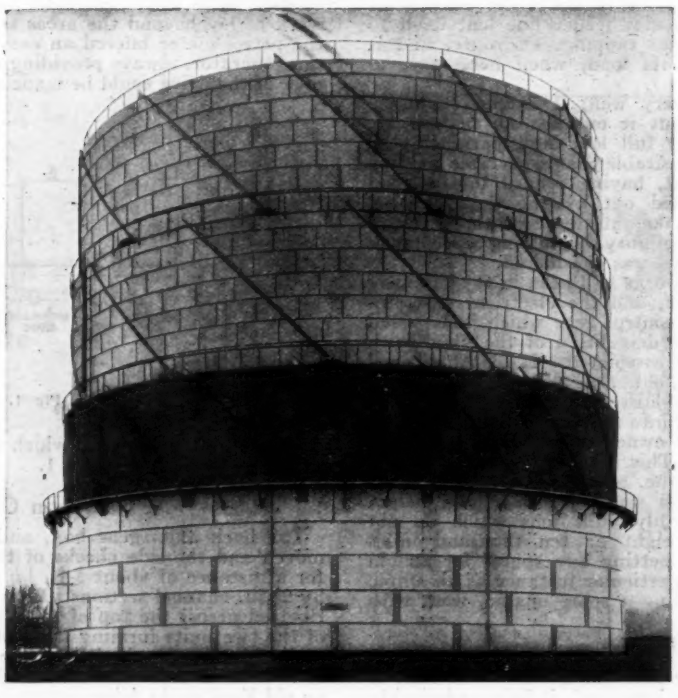

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when the vehicle was scrapped on the offchance of some future use being found for it.

It will be noticed that most of the weight of the motor generator set was carried on the solid axle and that the imposition of this load threw but little strain on the original chassis members. The wheels were complete with internal expanding brakes and these were coupled up to a brake lever conveniently situated on the off side of the truck.

The motor generator comprised a 100-volt × 130 amp. shunt-wound interpolar generator direct-coupled to a 10-b.h.p. 220-volt motor. The motor had a good overload capacity, and the generator was only worked at 70 volts, so that the balance of the two machines was better than the actual ratings would seem to indicate. The machines were flexibly coupled by means of one of the old clutch-gear box flexible discs, and the coupling was so designed as to permit of the coupled unit being driven, when required, by a vertical chain drive, from an engine driven shaft carried under the motor generator platform. The

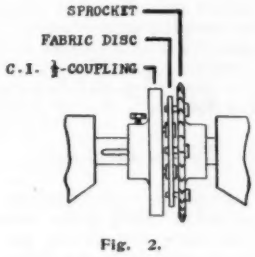

Fig. 2.

motor shaft was fitted with an ordinary cast-iron half-coupling, but the generator shaft carried a steel driving sprocket slightly larger in diameter than the coupling on the motor shaft.

Both the cast-iron half-coupling and the sprocket were fitted with projecting studs for engagement with the flexible disc, and a detailed sketch of the complete coupling is shown in fig. 2.

The Engine Drive.

An extension shaft was fitted between the clutch and a point immediately beneath the centre of the motor generator coupling. This shaft was fitted with a chain sprocket vertically in line with the sprocket on the generator shaft. When it was required to use the engine for the driving of the motor generator a chain was placed in position between these two sprockets. This extension shaft was carried in two ball-bearing plummer blocks mounted on cross members bolted to the underside of the chassis, and connection to the crank shaft was made via the clutch and the cardan coupling taken from the back axle worm drive.

The car had been driven by an underslung worm, and the engine, in consequence, had been installed with a definite fall towards the rear. This cardan coupling furnished an ideal method for correcting the lack of alignment between the inclined crank shaft and the horizontally installed extension shaft.

The final drive from the extension shaft to the motor generator took the form of a vertical chain running between the sprocket at the end of the extension shaft and the sprocket forming one portion of the motor generator coupling.

The dynamo (chain driven from the timing gear) was removed, and in its place was fitted a cast base with two bearings carrying a horizontal shaft fitted with a centrifugal governor. This governor ran at dynamo speed and throttle controlled the engine very closely to a speed of about 1,100 r.p.m. This furnishing was a very important feature, as a hunting engine would be fatal to good welding.

Controls.

A steel plate was fitted vertically at the off side of the chassis for the accommodation of the throttle and ignition levers, carburettor choke control, ignition switch, and oil gauge.

The rear petrol tank and autovac were removed and a dash tank of ample capacity installed. The steering column was shortened down, and a side seat was fitted in such a position as to give the attendant full control over the steering and the brakes when the outfit was being towed. These details are shown in the photograph—fig. 3.

A welding resistance frame is carried between the rear dumbirons, in the place vacated by the petrol tank. A substantial black "Sindanyo" panel is fitted across the rear of the chassis and carries the following electrical control gear:

Motor.—Double-pole switch fuse.
Face plate single automatic starter.
Shunt regulator.
Generator.—Single-pole switch.
Single-pole fuse.
Shunt regulator.
0/100 voltmeter.
0/150 ammeter.
Terminals for welding leads.

The field of the generator is connected across the motor brushes, giving separate excitation and ensuring a steadier welding voltage than would be possible if the dynamo were self-exciting. When the set is being driven by the petrol engine the motor starter is held over in the full on position and the motor acts as an exciter.

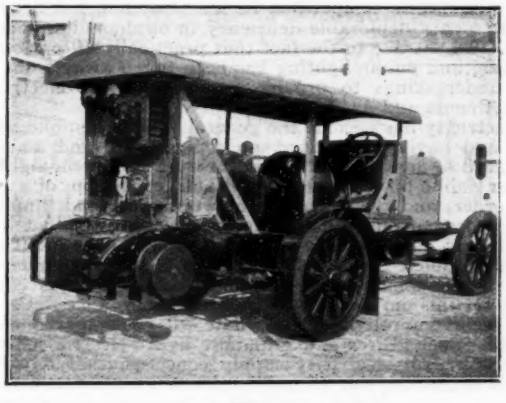

Fig. 3.

A light plywood canopy covered with painted canvas is fitted over the truck, as shown in the photograph. It is fitted with rails on both sides and at the rear, for the accommodation of canvas curtains, which, when the set is not in use, or in inclement weather, can be drawn closely around the whole of the electrical equipment.

The drum mounted on the rear offside is used for the accommodation of a C.T.S. flexible cable for tapping the works power lines when the set is working in the vicinity of those circuits.

Performance.

The performance of this outfit leaves nothing to be desired—it runs consistently, gives no trouble, and can handle a No. 8 electrode without any sign of overloading or distress. The engine—a four-cylinder 85 by 130 job—is amply cooled being fitted with a large radiator, a fan, and a circulating pump. It gives ample power at its governed speed of 1,100 r.p.m. and, when required, is capable of long runs without overheating.

As a general rule, the engine is little used, as the set usually operates in the area served by the works direct current supply which is tapped for the driving of the motor. As a precautionary measure the engine is run for a short time once a week, chiefly to ensure against those ignition troubles which so often develop following a long period of idleness.

This set was put into commission about two years ago, and has been in continual use on a wide variety of jobs, ranging from the building up of worn key-ways *in situ* to the re-conditioning of the tubes and shells of six Lancashire boilers.

The author's thanks are due to Mr. R. J. H. Clark, Chief Engineer of the Plymouth and Stonehouse Gas Light and Coke Company, by whose permission these particulars are published.

Patent Notes for Inventors.

To patent an invention is not so complicated as might be imagined, and a simple explanation will be found in "Patent Notes for Inventors," by the well-known Patent Agent, Mr. Reginald W. Barker. This little book is compiled for the guidance of inventors, and covers the main features of patenting, pointing out the pitfalls that await the unwary.

The author has also written an explanatory book upon "Trade Marks."

Copies of either of these books may be secured by writing to the publishers, Messrs. Reginald W. Barker & Co., 56, Ludgate Hill, E.C. Post free, 6d.

Gas *versus* Electricity in New Zealand*

By W. H. Cattell, Christchurch

The competition between gas and electricity for lighting was acute in the early years of the present century. Progressive developments in each appeared rapidly, and both improved immeasurably in the period from 1900 to 1920. Where the heat generated is of no consequence, as in outdoor lighting, gas is still pre-eminent. It was, undoubtedly, the stimulus of competition which led to all the improvements, and it is to be regretted that the absence of this stimulating competition in the Dominion has brought about such a deplorable deficiency in outdoor illumination here. This is due to the fact that practically all our street lighting and public lighting has been taken away from the gas undertakings to provide revenue for the electricity departments and power boards.

Electricity has become the general means of public lighting, and having, therefore, no competition, and no high standard of gas illumination to measure up to, the lighting of our public places is, almost without exception, of a very low order, and the difference between glare and illumination appears to have had little consideration. What little remains of gas lighting in our streets is of poor merit and mostly obsolete owing to the reluctance of our municipalities to spend money for the improvement on gas equipment for this purpose.

It seems improbable at this date with our Government's terrific expenditures and grandiose hydro-electric schemes and rate-aided electricity supply concerns, that any proposals of gas lighting of public places would even be considered. Some of the best lighted thoroughfares at home are gas installations, and where competition has sway, as in London in particular, some outstanding examples of gas lighting are to be seen. This fact is a surprise to many New Zealanders who visit England. For indoor lighting, electricity definitely has many attractions, but where a determined effort has been made by gas undertakings to retain the lighting load by up-to-date methods, I am sure the business is still worth while to them and well worth having.

Cooking.

With the increasing demand for better cooking facilities in the Dominion, there has been gradually evolved the present type of gas cooker with its enamelled finish. This is what was needed in the New Zealand homes to meet the conditions here, and it is very interesting to observe that the all-enamel finish which was first produced by English makers to meet the insistent demands of gas managers in the Dominion, has now become the standard also for the British market at home. Most of the improvements to be found on modern cookers have been suggested by one or more members of this Institute from time to time, as you will no doubt recollect.

The Gas Industry of the Dominion can now offer nicely finished and efficient cookers which will be a source of pleasurable satisfaction to their consumers for many years.

The electric cooker has been improving, too, generally copying the design of the gas cooker, but falling behind it in many ways. Where electric current is available at about ¾d. per unit there is little to be said about comparative costs. Performance, however, is an entirely different matter. I have had 18 months' experience of a modern all-electric home, including a well-known make of electric range. About three months ago I installed a gas cooker (table model). The improvement in the cooking results is the most outstanding feature in connection with the change over from electricity to gas. The much quicker boiling and better grilling were welcome—the anticipation of these rather diminished any possible surprise—but the improved cooking was an absolute surprise.

With regard to electrical competition in cooking, I really feel that even where current is sold at the unremunerative price of ¾d. per unit, you have nothing to fear, provided that you offer modern attractive cookers on terms which will appeal to your public. Each manager must decide for himself how far he should go with free fixing, free service pipes, and easy terms. Your competitors can only offer something which at best is a poor substitute for a modern gas cooker, but with their State-aided, rate-aided, unfair trading, backed with unlimited publicity in favour of electricity, it needs careful attention to see that gas retains its pre-eminence. Every old-fashioned gas cooker is a good advertisement for the modern electric cooker, and if the cooking load is to be retained, the old-style cookers should be displaced as soon as possible.

Just one remark about the general shape of gas cookers. When these were first made, as previously stated, they had usually to be fixed in sculleries where space considerations made it necessary to put the oven under the hotplate. These conditions are very different to our modern New Zealand homes, and yet we still have the hotplate over the oven. Why are we such slaves of fashion? The ideal place for the oven is higher up, alongside the hotplate, and so placed as to make stooping unnecessary. This model sells only in limited numbers because there is no room! When our women-folk realize the difference, the architect or builder who designs the home, will have to make room for the table model gas cooker.

Water Heating.

Electricity for domestic water-heating has had much attention and publicity. It has its attractions in some ways, and with the very low prices per unit which are generally charged, the cost is reasonable. But here again, as with cooking, performance is what matters. It is all very nice to buy current at a low rate, and for the water to be heated during the night hours, and to have a plentiful supply of rather hot water for the morning bath, but this is where it ends. I personally strongly object to being asked to " go easy on the hot water " so as to leave enough for domestic uses later in the day. This is where gas scores. Quick recovery is essential with domestic hot water services, and the charm of the use of gas is that an abundant supply of hot water can be had at any hour of the day or night. I have installed a geyser to augment the electric-heated service in the house I now occupy.

The combination of a gas cooker with a coke boiler is purely a New Zealand product, and there is nothing nearly so attractive in use in England. In fact I was told there that combinations are " no good." How good they really are is too well-known to you to need my commendations. In districts where the winter months are cold, they appear to be mostly used and appreciated. Probably one of these combinations coupled up to a modern type of gas-heated cylinder storage would be the ideal. Thus the consumer could use gas almost exclusively during the summer months, and have an ample supply of hot water from the coke fire in the winter—with gas always available in case of need.

Some gas undertakings are now reaping the benefit of their endeavours in past years in the development of the water-heating load, but generally it is a field in which there is still much to do, and large business to be had. It will be of little use to try to sell large quantities of gas for this purpose at the old rate of lighting.

Publicity.

Anything referring in any way to electricity is " news " in the Dominion newspapers. It is a notable occurrence to see any reference to gas unless it is one of the many paid-for displays, or the " write up " which accompanies a special appeal.

You will perhaps hardly credit the fact that when the disastrous 'quake shook Napier and the district so lamentably, there was no reference to gas-works at Napier, Hastings, and Gisborne in the English Press reports. Almost every other conceivable interest was mentioned, but there was not a word about gas. This is no doubt entirely due to gas not being news in any way in the Dominion (unless an explosion from any cause, or a gas suicide or something of that nature). Those interested at home, and keenly anxious to know what had happened to our friends in the affected area, had to send out cables of inquiry and wait for replies.

This remarkable state of affairs is even worse than it was at home before the formation of the B.C.G.A. There is a cure for it, and a very simple one too. All that is needed is controlled publicity.

In Great Britain the British Commercial Gas Association wields great influence, simply because it has much money

* Extract from paper before Tenth Annual Meeting of the Gas Institute of New Zealand, February, 1934.

for advertising at its control. News items concerning gas matters now appear in the British Press, and any statement or mis-statement which affects the good name of gas in any way is taken up by the B.C.G.A., but this is now rarely necessary. The result is that care is exercised in the dissemination of news concerning gas matters, and sub-editors have been taught to be careful. How different in New Zealand!

Suggestions of co-operative advertising have previously been made and discussed, and I know that I am not breaking new ground with this topic. In spite of the failure of the earlier negotiations some years ago, our need is all the greater now, and I urge its reconsideration. We do not get the general publicity we want, because we do not deserve it, and we shall only get it when we have some central organization controlling, directly or indirectly, all Press advertising throughout the Dominion.

The larger companies who failed to find a basis a few years ago would surely be big enough to re-open the matter, and to give a lead in this.

At the present time the needs of the situation could probably be met by the appointment of one of the larger advertising agencies to whom the control of all advertising would be handed, and the commission they would receive from the Press would probably meet their needs, so that the question of spending more money on advertising does not at the moment arise. What is necessary in our mutual interests is co-ordination and co-operation. This matter is more urgent than is apparent. We are still suffering from unfair competition from our State-aided competitor, which is the pet of the politicians and the public service. Do not forget that with the completion of more and more hydro-electric schemes they will have to do much to bolster up the revenue of these gigantic undertakings, which will probably be obsolete before they become remunerative (to the taxpayer), and gas, with its wonderful record of reliability and service, will find it more difficult to achieve even its normal progress.

This Institute should, I think, at least discuss this very important matter again, and endeavour to promote some development in the matter of co-operative publicity in our mutual interests.

Conversion of Intermittent Verticals to Chamber Ovens*

By James Lowe, A.R.T.C., M.Inst.C.E., M.Inst.G.E., Auckland

All carbonization at the Devonport Works of the Auckland Gas Company from 1915 until 1930 was by means of intermittent vertical retorts, 4 metres long in settings of eights. Steaming was practised during the last two hours of carbonization until May, 1923, when it was discontinued and the continuous automatic water gas plant was started.

In 1930, it was decided to convert one setting to chamber ovens, and this was completed and the setting was put to work on Nov. 2, 1931. So satisfactory was the working of the first setting of chamber ovens that it was decided to convert immediately two additional beds to the same system. These were completed and set to work on May 10, 1933, and since then all carbonization at the Devonport Works has been done in chamber ovens.

In carrying out the conversions, it was considered desirable to make use of as much of the existing plant as possible. The top mouthpieces, gas off-take pipes, hydraulic mains, &c., were used again. The steel platform surrounding the mouthpieces was scrapped, and brickwork was substituted at approximately the same level, four underlying courses being of special insulating bricks which the Auckland Gas Company is manufacturing and putting on the market. This change has made the holding down bolts on the mouthpieces and the gas off-take pipes more accessible, and has reduced the temperature on the platform.

It was, of course, necessary to scrap the cast-iron bottom plates supporting the retorts, also the longitudinal beams on which the bottom plates rested, and to supply new bottom doors suitable for the ovens, and transverse beams for their support.

The ovens are 13 ft. 2¼ in. high from fireclay mouthpieces to bottom doors, and are built of silica tiles 14½ in. by 15⅝ in. by 3 in. thick. The sides of the ovens are convex outwards, the camber being 1 in. The cross section at the bottom of the oven is 5 ft. 10½ in. by 13 in. broad in the centre and tapers to 5 ft. 7 in. by 11 in. broad in the centre at the top of the chamber. The taper of the sides is ¼ in. per ft. and the taper of the ends is $\frac{7}{16}$ in. per ft. approximately. A special feature of these settings of chamber ovens is the provision of a duct for each oven in the brickwork setting parallel to the vertical axis of the oven. These ducts are 6 in. in diameter and are connected by branch ducts to each oven near the bottom. Gas from the lower portion of each oven will thus flow through the branch ducts and duct into the gas off-take pipe.

This method of taking off gas and relieving gas pressure from the lower end of the chamber oven renders unnecessary the duplication of gas off-take pipes, hydraulic mains, dip pipes, tar and liquor pipes, and valves, which is customary in installations of chamber ovens.

It might be expected that the ducts would become choked by deposits of carbon, and consequently become ineffective for the purpose of taking off gas and reducing gas pressure in the lower part of the chamber ovens. As a matter of fact, experience has shown that there is no difficulty in keeping them free of blockages.

In order to keep the ducts in good condition, it is necessary to burn out the carbon every six weeks. This takes six hours only. The method is to open the bottom door and take cap off pipe above duct, keeping top charging doors closed. The draught of air through the ducts is sufficient to burn away the carbon within the time mentioned. Of course, the ducts should never be allowed to become entirely blocked.

There is very little leakage of gas from either top or bottom doors, indeed, it is difficult to tell by the eye whether the ovens are at work or not. The coke falls readily and without poking when the bottom doors are opened.

The coke is of metallurgical quality and readily sells for a much higher price than ordinary retort coke.

After more than two years of use, practically no deterioration can be discerned in the first setting of chamber ovens or in the silica tiles of which the ovens are built. All the silica tiles and blocks and refractory materials, including insulating bricks, used in the conversion of the settings to chamber ovens, were manufactured at the brickworks belonging to the Gas Company, and all iron and steel work was also of local manufacture.

In my opinion the chamber oven system is the ideal system for carbonizing the highly caking and swelling bituminous slack coals, which are the gas coals of New Zealand. It will also deal with coals of any other variety and it is probably more catholic in its taste for coal than any other type of carbonizing plant. At Devonport, each oven is charged with 25 cwt. of coal and 18-hour charges are at present being worked. The period of carbonization can be reduced to 16 hours and probably to a shorter period, and when this is done there is a saving in the amount of coke used in the producers.

At the time of writing there are twelve ovens at work for an output of 300,000 to 350,000 c.ft. of gas per day, and this gives easy conditions and an ample margin of carbonizing plant at work; but the same output can be obtained from eight ovens for a smaller expenditure of coke in the producers. In such case, however, there is no margin. The chamber ovens are operated by one stoker per shift for three shifts per day and, in addition, one extra man on the day shift who attends to the fires, retort patching, and hydraulic mains.

In addition to the stoker, there is always another man on shift whose duty is boiler firing and exhauster house attendance, &c., so that after ordinary working hours there are always the two employees present on the works. Elevating coal to coal hoppers in the retort house, bagging coke, barrelling tar, charging purifiers, &c., is done by yard labourers. The writer is of opinion that the output could be doubled without adding to the number of shift workers.

The stoker on shift discharges the coke into the hot coke wagons, pushes coke wagons to the coke quenching tower, re-charges ovens with coal, then pulls wagons up the coke ramp by means of the wire-rope hoist, and tips the coke from the wagons on to the coke screens and attends generally to the carbonizing plant.

* Extract from paper before Tenth Annual Meeting of the Gas Institute of New Zealand, February, 1934.

Notes on Distribution*

By H. Horrocks, Assoc.M.Inst.Gas E., Dunedin

It is of little use having satisfactory pressures in the street mains if there are serious drops in pressure at consumers' appliances, due to services and meters being defective, or of inadequate capacity. We have, therefore, at Dunedin given considerable attention to the matter of regular and adequate service from street main to consumers' appliance. With few exceptions no service of less than 1 in. diameter is now laid. When mains are renewed before the existing services are coupled up to the new main, they are blown out by means of a force pump and relaid when necessary. The slight expense incurred in this work is thoroughly justified by results. Our experience is that a street thoroughly overhauled in this manner is complaint-free for years.

That part of our area known as " The Flat " was until comparatively recent years a tidal swamp, and the subsoil has a most destructive action on wrought-iron piping. Steel pipes have proved to be useless in this ground. Wrapped-steel mains have been taken up riddled with holes after less than ten years' use. In some streets wrought-iron pipes have had to be replaced within five years. The subsoil appears to deodorize escaping gas, and it is not uncommon for a service pipe to be almost entirely destroyed before the need for replacement is discovered. The advent of a drainage system, resulting in a drier subsoil, has considerably improved the position during recent years. Both galvanized and " Armco " piping have been tried, wrapped with hessian and tarred, but our experience is that tarring and wrapping do not materially lengthen the life of the pipe. All services laid in this area are now boxed and pitched. A number of services that were boxed fifteen years ago in bad ground were recently bared for examination. Although in most cases the timber of the boxing was more or less perished, the pitch covering was intact. The pitch was chipped back to the metal in a number of places, and without exception the pipes were found to be in excellent condition.

As fast as our finances permit, we are systematically boxing services, street by street, but some years must elapse before the whole of the services in bad ground have been dealt with. We are satisfied that the money spent on this work is a thoroughly sound investment, both for the savings we shall effect in unaccounted-for gas, and by the lessened cost of service renewals in the years to come. Reinstatement of street charges alone are such a heavy item nowadays that the little extra cost incurred in putting down a job that will prove permanent will ultimately be saved in street reinstatement charges alone.

Notice is always given us by the City Engineer of all streets it is proposed to lay down in permanent paving. In these streets all services in roadways are boxed and pitched. When circumstances warrant it, a separate main is laid in the footpath on the opposite side from the original main, services from the latter, on the short side, being boxed into the footpath.

In the writer's opinion the ideal system would be to have no services in roadways, but to lay a main in each footpath. House sections are so large, however, in some areas, that the cost of laying two mains in every street would not be warranted. In the main thoroughfares we are, however, gradually getting mains on both sides of the street. Our first objective in this direction was the cutting out of all services crossing tram tracks, and this part of our programme was recently completed.

The Dunedin City Council's by-laws governing the supply of gas were revised in 1929, and give us ample powers to deal with the inspection of consumers' fittings and appliances. Only licensed gasfitters are allowed to work on gas pipes and appliances, and all new work has to be passed by our Inspector before a meter is supplied. Notification must also be made to the Gas Department of any alterations made to existing installations. In addition to the advantage of inspecting the new fittings, we are, thereby, enabled immediately to provide a larger meter should additional appliances have been installed.

Considering the scattered nature of gas supply in New Zealand (the consumption per mile of main in Dunedin last year was only 1,700,000 c.ft.) our unaccounted-for gas figure may, I think, be considered satisfactory, the average for the past five years being 6·1%. Last year (1933) was 5·2% and the first half of the present financial year showed a further small reduction compared with the corresponding previous half year. The sale of gas per ton of coal for 1933 was 18,272 c.ft. of 500 B.Th.U. gas. Our make per ton last year was, however, 500 c.ft. less than usual owing to the vertical retorts being overhauled, which necessitated the old horizontal bench being put into action for a few weeks.

The record of our work in Dunedin contains nothing either spectacular or unique. The incentive to carrying out the work described in this paper has been our realization of the fact that, however modern or well equipped a manufacturing plant may be, or how highly sales organizations may have been developed, one cannot hope to increase, or even maintain, sales if mains, services, and meters are too small, and the distribution department generally so indifferently equipped and organized that consumers cannot obtain an adequate supply of gas whenever they want it. One of the gratifying results of the work carried out during the past few years is the large reduction in the number of complaints of " bad supply " received. Another factor, perhaps not easily measured, but nevertheless of great value, is the greater confidence that salesmen, fitters, and complaint men have in dealing with consumers, when they know that in making sales, fitting appliances, or attending to complaints they have behind them an organization that can guarantee an adequate and constant supply of gas to each and every one of their clients.

* Extract from paper before Tenth Annual Meeting of the Gas Institute of New Zealand, February, 1934.

Gas Undertakings' Results

Johnstone.

The Johnstone Gas Department, in spite of electrical competition, reports that gas consumption for last year was nearly 2,900,000 c.ft. in excess of the previous year, being a record in the history of the Undertaking. The net profit for the year ended May 15 amounted to £670.

Lancaster.

The annual report on the working of the Lancaster Gas Department, for the year ended March 31, shows a net profit on the year's trading of £7,587, which has been placed to the credit of the net revenue appropriation account, making, with the credit balance brought in from the previous year of £18,559, a total credit of £26,147. The coal carbonized during the year amounted to 25,428 tons. The gas manufactured was 452,534,000 c.ft., an increase of 15,073,000 c.ft., or 3·44%. The average yield of gas per ton of coal carbonized was 17,796 c.ft. of a declared value of 475 B.Th.U. per c.ft., equal to 84·53 therms per ton of coal. The gas sold, including public lamps, was 400,499,276 c.ft., and the gas used by the Department 7,859,830 c.ft., making a total of 408,359,106 c.ft. accounted for. Coke, tar, and ammonia products have realized £11,083 net, equal to 8s. 8·61d. per ton of coal carbonized, or 43% of the cost of coal. The number of consumers has been increased by 377, and the total number of consumers connected to the Department's mains is now 5,395 prepayment and 5,729 ordinary, making a total of 11,124. The sales of gas consuming appliances has been most satisfactory.

Malton.

The Directors' report of the Malton Gas Company for the half-year ended June 30, 1934, shows that in the revenue account, the expenditure has amounted to £7,856, and the receipts to £9,895, which leaves a profit of £2,039. This compares with a profit of £1,895 made during the corresponding period last year. The consumption of gas for industrial and domestic purposes is exactly the same as last year, but there has been an increase of 1,400,000 c.ft. or 7,000 therms in the sales for public lighting. With the exception of tar, the receipts from residuals, asphalting, and fittings have all increased. After paying income-tax, there is a balance of £7,330 available for the payment of dividends. Out of this amount, the Directors recommend a payment of 6½% free from deduction of income-tax. This will absorb £1,500, and leave the sum of £5,830 to be carried forward, which is £133 more than the amount carried forward twelve months ago.

Morpeth.

The gross profit of the Morpeth Gas Lighting Company for the year ended June 30, amounted to £3,219, which, with £1,126 brought forward, gives a total of £4,345. The Directors recom-

mend that this be dealt with as follows: In writing off for depreciation on meters and cookers, £558; in placing to reserve for special renewals of plant, &c., £250; in placing to general reserve account, £100; income-tax, £488; in paying 6% for the year on the preference shares, less income-tax; 7%, free of tax, for the year on ordinary shares; and in carrying forward a balance of undivided profits of £1,121. While there has been a satisfactory increase in the number of customers and in the use of gas appliances, there has not been that corresponding increase in the gas sales, which might have been expected.

Oldham.

The net profit on the year's working of the Oldham Gas Department was £38,977, which has been reduced, by the contribution to the Borough Fund of £4,000, to the sum of £34,977. The quantity of gas manufactured at the different stations during the year ended March 31 was 1,465,816,000 c.ft., or 6,962,621 therms. The amount of coal used in its production was 79,609 tons. The average quantity of coal gas made per ton of coal carbonized during the past year was 18,408 c.ft., or 87·4 therms, as compared with 17,273 c.ft., or 82·2 therms, in the previous year. The total number of meters fixed at March 31 last was 64,694, which is an increase of 819 as compared with last year. The number of prepayment meters in use has increased during the year from 37,093 to 38,933. The quantity of gas consumed through this type of meter amounted to 655,295,700 c.ft., compared with 659,443,300 c.ft. last year, and from this type of meter £122,877 has been collected during the twelve months, which is a decrease of £1,523. A total of 849 meters have been fixed in new premises and others in which gas was not previously used, and 100 meters have been permanently disconnected. The actual number of consumers at March 31 last was 58,968. The quantity of gas consumed by public lamps during the past year was 89,186,000 c.ft. Compared with last year this shows a decrease of 1,109,000 c.ft.

Salford.

The annual report of the Salford Gas Department for the year ended March 31, 1934, records that while the number of consumers still continues to increase there has been a decrease in the sales of gas amounting to 4·01%. The coal carbonized during the year amounted to 115,086 tons as compared with 118,264 tons for the previous year. The quantity of gas made was 1,760,312,000 c.ft. as compared with 1,806,450,000 c.ft. for the previous year, representing an increase of 20 c.ft. in the gas made per ton of coal. The length of gas mains has been increased during the year to 377 miles, 737 yards. The total number of ordinary and prepayment gas cookers on hire at March 31, 1934, was 29,810, and the total number of gas fires on hire at the same date was 8,564. The receipts from the sale of gas and rental of stoves show a decrease as compared with last year of £12,183. This decrease is entirely due to the fall in the consumption of gas. There is a decrease in the receipts from the sale of residual products of £5,603. Of this decrease about £4,000 is due to a lower average price being obtained from the sale of coke owing to severe competition from manufacturers of furnace coke and to a slight decrease in the market prices for tar; the balance, £1,600, is due to the lesser production of residuals from the reduced tonnage of coal carbonized.

Warrington.

The Warrington Corporation Gas Department, in their annual report, state that there has been a net profit of £2,775 on the year's income of £153,762. The corresponding figures for the previous year were £6,258 and £152,458 respectively. The quantity of gas sold was 661,277,500 c.ft., as against 663,410,000 c.ft. in 1932-33. The consumers number 6,878 (6,862) by ordinary meters and 18,601 (18,432) by slot meters.

Legal Intelligence

Successful Appeal in Patent Action.

Mr. Justice Luxmoore, in the Chancery Division of the High Court, on July 31, 1934, dealt with an appeal by the Koppers Company, of Pittsburg, U.S.A., the owners of Patent 226,147, and Woodall-Duckham (1920), Ltd., of London, the licensees of the patent and the owners of Patent 314,659, against a refusal of the Comptroller of Patents to revoke patent, No. 366,656, held by the respondents, Gas Chambers and Coke Ovens, Ltd., and Norman J. Bowater and A. H. Lymn.

This patent had been granted to the respondents in respect of an invention in or relating to carbonizing chambers or retorts.

Mr. Trevor Watson, K.C., for the appellants explained that the grounds of appeal were prior publication in four prior documents, and insufficient description. The Comptroller had expressed the view that, looking at the invention in the light of certain passages in the provisional specification which had been omitted from the complete specification and amending the complete specification to that extent, he would decline revocation.

Mr. Justice Luxmoore, in a written judgment, said that the appellants claimed revocation, or, alternatively, a further amendment of the patent. He was satisfied that the amended specification did not disclose any invention sufficient to support the grant of a patent substantially different from what had been disclosed in the prior specifications upon which reliance was placed. The appeal would therefore be allowed and the patent would be revoked, the respondents to pay appellants' costs.

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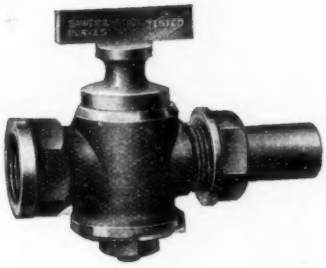

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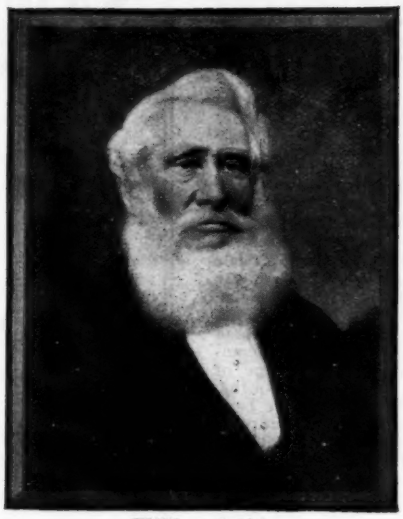
PHONE: COLLYHURST 2289
GRAMS: SAWER MANCHESTER

CENTENARY OF

1834 THE HOUSE OF SMITH 1934

WILLIAM SMITH
FOUNDER
AND INVENTOR
1834 - 1884

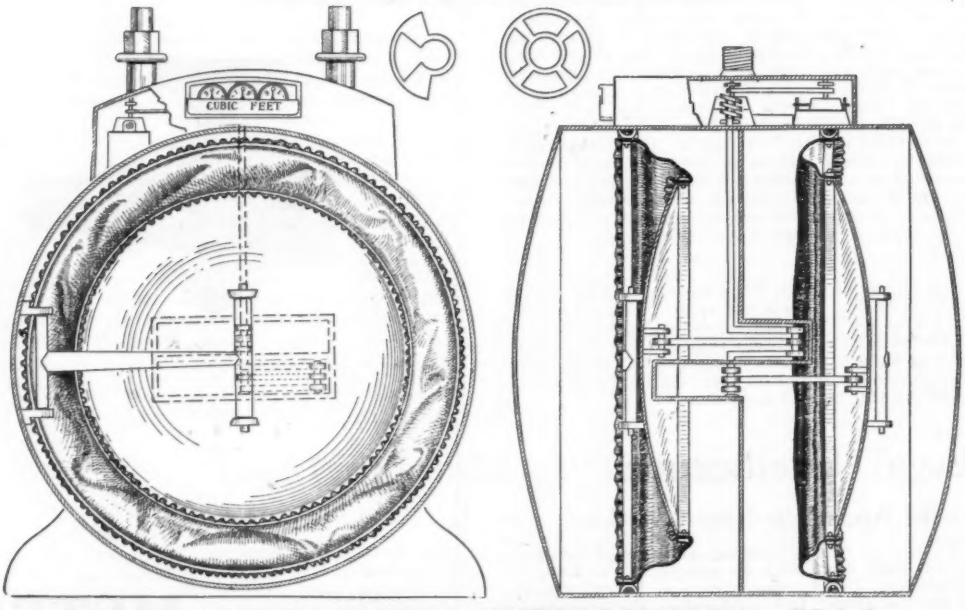
100 YEARS' SERVICE TO THE GAS INDUSTRY



William Smith

(IN 1846 CONSUMERS' METERS WERE IN EMBRYO, PRESSURE WAS LACKING, GAS IMPURITIES WERE VERY MUCH IN EVIDENCE)

THEY ANTICIPATED THE IDEAS OF TO-DAY, AND INTRODUCED THE SECOND DRY METER 1846, WITH TWO SEAMLESS DIAPHRAGMS WITH INCREASED CAPACITY, ALSO ROTARY VALVES.



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Gas Markets and Manufactures

Stock Market Report.

[For Stock and Share List, see later page.]

The uneasiness concerning International affairs soon passed away last week, and active conditions were resumed in most markets. British Funds became popular again and improved in value, while Colonial stocks, gold-mining, and rubber shares were heavily dealt in. A large volume of business was also recorded in the latest new issues, most of which are now offered at a premium.

Business in Gas stocks and shares was also heavier last week and prices remained firm. A glance at the Stock and Share List shows that several issues improved in value, and that there were no falls. The shares of the South-Eastern Gas Corporation are now officially quoted, and in accordance with the usual practice have been included in the List, the ordinary shares being quoted at 28s. 3d., the preference shares at 22s. 3d., and the debenture stock at 101½; business being recorded in the former two issues at top prices. It will also be noticed that the Malta and Mediterranean ordinary capital, which formerly consisted of £5 shares, is now quoted at per £100 ordinary stock, the price being 205. Among last week's interim dividend announcements appear: Newcastle 2½%, Chester 2½%, and East Surrey 3%.

For pursuance of its objects the Severn Valley Gas Corporation has made an offer to acquire the whole or any part of the preference and ordinary shares of the Ludlow Union Gas Company. The terms have not been published, and the offer appears to be unconditional upon any majority for acceptance. It will be remembered that the Corporation recently obtained control of the Gloucester Gas Light Company.

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *Aug.* 3.

There are no changes to report in the tar products market, and current prices are as follows:

Pitch, 57s. 6d. per ton f.o.b.

Creosote, 4d. to 4¼d. per gallon.

Refined tar, 4d. to 4¼d. per gallon in bulk at makers' works.

Pure toluole, about 2s. 2d. to 2s. 3d.; pure benzole, 1s. 9d. to 1s. 10d.; 95/160 solvent naphtha, 1s. 7d. to 1s. 8d.; and 90/160 solvent naphtha, 1s. 7d. to 1s. 8d.; and 90/160 pyridines, 7s. to 7s. 6d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Aug. 3.

The average prices of gas-works products during the week were: Gas-works tar, 25s. to 30s.; Pitch—East Coast, 55s. to 57s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 55s. to 57s. 6d.* Toluole, naked, North, 1s. 9d. to 1s. 11d. Coal-tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 9¾d. to 10¾d. Creosote, *ex* works, in bulk, North, liquid and salty, 3¾d. to 3⅞d.; low gravity, 3¾d. to 3⅞d.; Scotland, 3d. to 3¼d. Heavy oils, in bulk, North, 3⅞d. to 4¼d. Carbolic acid, 60's, 1s. 11d. to 2s. 1d. Naphthalene, £10 to £11. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Aug.* 4.

Quotations are well maintained and a reasonable volume of new business has been placed during the week.

Crude gas-works tar.—The actual value is 34s. to 36s. per ton *ex* works in bulk.

Pitch.—Little or no interest is being taken in this product, and prices remain nominal at 45s. per ton f.o.b. Glasgow for export, and about 42s. 6d. to 45s. per ton *ex* works in bulk for home trade.

Refined tar.—Plentiful supplies are still available, but prices appear to be at their lowest at 3d. to 3¼d. per gallon f.o.r. makers' works naked.

Creosote oil.—Production is well looked after and values are steady. B.E.S.A. Specification oil is 4d. to 4¼d. per gallon; low gravity, 4½d. to 4¾d. per gallon; and neutral oil, 4¼d. to 4½d. per gallon; all f.o.r. at makers' works in bulk.

Cresylic acid.—New business is being placed and values are firm. Pale, 97/99%, 1s. 3d. to 1s. 4d. per gallon; dark, 97/99%, 1s. 0½d. to 1s. 1½d. per gallon; pale, 99/100%, 1s. 4½d. to 1s. 5½d. per gallon; all f.o.r.

Crude naphtha.—Production is low, and available supplies command 4¾d. to 5¼d. per gallon, according to quality.

Solvent naphtha.—90/160 grade is 1s. 3d. to 1s. 4d. per gallon, and 90/190 grade 8d. per gallon.

Motor benzole.—This continues to be valued at 1s. 5d. to 1s. 6d. per gallon.

Pyridines.—90/160 grade is 6s. to 7s. per gallon, and 90/140 grade is 7s. to 8s. per gallon (nominal).

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d		s. d		
Crude benzole	0 9	to	0 9½	per gallon at works	
Motor "	1 3½	"	1 4	"	"
90% "	1 4	"	1 4½	"	"
Pure "	1 7½	"	1 8	"	"

Trade Notes.

Non-Rust Liquid Lead Company, Ltd.

On and after August 6, 1934, all orders and correspondence for the Non-Rust Liquid Lead Company should be sent to their works at 40, Feeder Road, Bristol 2. Telephone 76815. The registered office of the Company is at 14, Clarges Street, London, W.

"Ideal" Boilers, Radiators, and Accessories.

A new catalogue has recently been published by the National Radiator Company, Ltd., of Great Marlborough Street, W. 1, containing particulars and illustrations of all current "Ideal" radiators and boilers, including certain new designs which have been introduced since the previous edition was published.

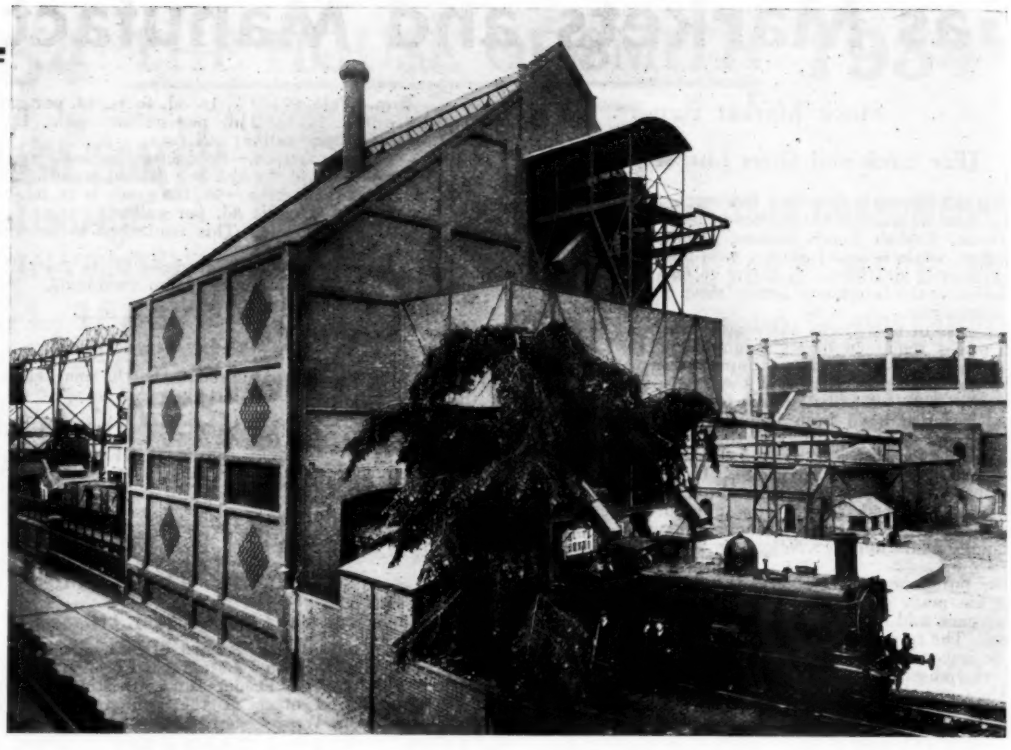
Renold and Coventry Products.

We have received from the Renold and Coventry Chain Company, Ltd., copies of their 1934 illustrated price list and stock chain drives. Increased raw material prices have necessitated increased prices in a few cases; but in others improved manufacturing arrangements and increasing volume have enabled the firm to make reductions, particularly in regard to their balance and conveyor chains.

Good Year's Work at West Bromwich.

The total quantity of gas manufactured was 537,615,000 c.ft., or 2,415,024 therms, as compared with 515,539,759 c.ft., or 2,318,499 therms the previous year, an increase of 22,075,241 c.ft. (96,525 therms), or 4·28%. The total quantity of coal carbonized was 27,242 tons, as compared with 26,765 tons last year, an increase of 477 tons. The quantity of carburetted water gas made was 18,007,000 c.ft., as against 9,810,749 c.ft. in the previous year, and the quantity of gas oil carbonized was 30,323 gallons, as compared with 17,097 gallons last year. The quantity of coke and breeze produced was 15,254 tons, an increase of 380 tons, and the quantity of coke sold was 8,399 tons, against 7,843 tons. The total revenue from coke and breeze sold during the year was £10,528, against £10,186 last year. It is interesting to note that West Bromwich was one of the first works to adopt the practice of burning breeze in place of coke in the producers of the vertical retort installation, and since the necessary alterations were made the plant has continued to give satisfaction. The total revenue from tar for the year is £4,494, against £4,058 last year. During the year there have been laid 3,102 yards of new mains of varying sizes, and the total length of gas mains in the area of supply is now 86 miles 1,381 yards.

The percentage of unaccounted-for gas was 8·43, as compared with 9·86 last year. The total number of lamps in the Borough is 1,733, being an increase of 46, as compared with last year. It is gratifying to report a substantial increase in the gas sold for all purposes, and also that this year is a record in the history of the Undertaking for the total quantity of gas sold. The total number of consumers at the close of the financial year was 18,680, as compared with 18,601 at the close of the previous year, an increase of 79. The gross profit for the year, as shown by the revenue account, is £17,285, as compared with £17,240 the previous year, while after meeting annual charges for interest, sinking fund, and income-tax, there is a net profit of £9,075 this year, as against £8,014 last year.



Worcester

The installation of 12 Glover-West continuous vertical retorts, with an estimated daily gas-making capacity of 1,080,000 c.ft., inaugurated on July 10th, 1934, at the works of the Worcester New Gas Light Company.

The latest installation of Glover-West verticals to be put into service . . .

In this country and in countries overseas there are now 9,900 vertical retorts of the Glover-West continuous type meeting the gas requirements of 230 cities and towns. The estimated total daily gas production of these retorts exceeds 520 million cubic feet. And almost all installations are served by West's coal and coke conveying, cutting, grading, and storage plant designed for maximum efficiency in working results.

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Glover-West continuous vertical retorts . . . . West-vertical semi-intermittent chambers . . . . The West lip-bucket conveyor with automatic lubrication . . . . All types of modern coal and coke breaking, grading, and conveying plant . . . . Wagon-tippers . . . Telpher plants . . . . Breeze-burning producers . . . . Waste-heat recovery equipment.

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STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Aug. 3.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
1,551,868	Stk.	Apl. 9	7	7	Alliance & Dublin Ord. ...	130—140	...	139
374,000	,,	June 25	4	4	Do. 4 p.c. Deb. ...	90—100	...	...
557,655	,,	Mar. 5	7	7	Barnet Ord. 7 p.c.	167—172	...	170—171½
300,000	1	May 7	1/4½	1/9½	Bombay, Ltd.	27/6—29/6	...	28—28/6
178,480	Stk.	Feb. 19	9½	9½	Bournemouth sliding scale	203—208	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	167—172	...	...
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	142—147	...	...
50,000	,,	June 11	3	3	Do. 3 p.c. Deb. ...	78—83	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	122—127	...	...
357,900	,,	Mar. 5	7½	7½	Brighton, &c., 6 p.c. Con. ...	162—167	...	167
540,000	,,	,,	6¾	6¾	Do. 5 p.c. Con. ...	151—156	...	...
195,500	,,	,,	6	6	Do. 6 p.c. B. Pref.	140—145	...	...
1,487,500	,,	July 9	5	5	Bristol 5 p.c. max.	116—118*a*	...	...
120,420	,,	June 11	4	4	Do. 1st 4 p.c. Deb. ...	102—105*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	102—105*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	121—123*a*	...	...
855,000	,,	Apl. 9	7	8	British Ord.	155—160	...	157½—158¾
100,000	,,	June 11	7	7	Do. 7 p.c. Pref.	154—159	...	...
360,000	,,	,,	5½	6½	Do. 5½ p.c. Pref.	104—109	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	107—113	...	...
160,000	,,	June 11	5	5	Cambridge 5 p.c. Deb. ...	115—120	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	2—4	...	...
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref. ...	5—7	...	...
150,000	Stk.	July 23	4½	4½	Do. 4½ p.c. Deb. ...	90—95	...	91
626,860	,,	Feb. 19	6	6	Cardiff Con. Ord.	126—131*	...	...
237,860	,,	June 11	5	5	Do. 5 p.c. Red. Deb.	103—108	...	...
157,150	,,	July 23	6½	5	Chester 5 p.c. Ord.	113—118*b*‡	...	...
98,936	1	May 7	2/-	2/-	Colombo, Ltd. Ord.	1⅝—1¾	...	...
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	19/- - 21/-	+/-/6	20/—20/9
609,204	1	Mar. 19	/11'4*	/11'48	Colonial Gas Assn. Ltd. Ord.	19/6 - 21/6	...	20/-
296,053	1	,,	1/8'80	1/8'80	Do. 8 p.c. Pref.	23/6 - 25/6	...	24/-
1,775,005	Stk.	July 23	6½	5	Commercial Ord.	118 - 123*	...	122½
475,000	,,	June 11	3	3	Do. 3 p.c. Deb. ...	82 - 87	...	87
286,344	,,	Mar. 5	5	5	Do. 5 p.c. Deb. ...	120 - 125	...	...
807,560	,,	Feb. 19	7	7	Croydon sliding scale ...	154 - 159	...	157—158
569,590	,,	,,	5	5	Do. max. div.	105 - 110	...	109—110
620,385	,,	June 25	5	5	Do. 5 p.c. Deb.	119—124	...	...
542,270	,,	Mar. 5	7	10	Derby Con.	175—180*e*	...	...
55,000	,,	June 25	4	4	Do. 4 p.c. Deb.	97—100*e*	...	...
209,000	,,	Feb. 19	5	5	East Hull Ord. 5 p.c. ...	106—111	...	...
181,625	,,	Mar. 5	6	6	East Surrey Ord. 5 p.c. ...	126 - 131	...	...
175,609	,,	June 11	5	5	Do. 5 p.c. Deb. ...	120 - 125	...	...
1,002,180	,,	Apl. 9	†5	†7	European, Ltd.	125—130	+2	126¼ - 127
19,342,763	,,	Feb. 19	5⅝	5⅝	Gas Light & Coke 4 p.c. Ord.	27/—27/6*f*	...	27/—27/6½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max. ...	87—90	...	88—89
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	105—108	...	107½—108
6,102,497	,,	May 28	3	3	Do. 3 p.c. Con. Deb. ...	85—88	...	87—88
2,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	115—118	...	117½—118
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	113—116	...	114½—115½
270,466	,,	Mar. 5	6	6	Harrogate New Cons. ...	129 - 134	...	132—133
82,500	,,	Mar. 5	7	7	Hastings & St. L. 5 p.c. Conv.	147—152	...	...
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv	118 - 123	...	...
140,000	1	Apl. 23	1/7½	1/7½	Hongkong & China, Ltd. ...	1⅞—1⅞	...	29/6 29/9
218,200	Stk.	Mar. 5	6	6	Hornsey Con. 3½ p.c. ...	128 - 133	...	...
5,500,000	,,	May 28	10	†4	Imperial Continental Cap.	205 - 215	...	205—209½
223,180	,,	July 23	3½	3½	Do. 3½ p.c. Red. Deb.	88 - 93*	...	...
235,242	,,	Mar. 5	8½	8½	Lea Bridge 5 p.c. Ord. ...	169 - 174	...	...
9,167,410	,,	Mar. 5	6	6	Liverpool 5 p.c. Ord. ...	133 - 134*b*	...	...
245,500	,,	June 11	5	5	Do 5 p.c. Red. Pref. ...	101—111*b*	...	...
306,083	,,	July 16	4	4	Do. 4 p.c. Deb. ...	100½ - 102½*b*	...	...
165,736	,,	Feb. 19	8	10	Maidstone 5 p.c. Cap. ...	180 - 190	...	...
56,176	,,	June 25	3	3	Do. 3 p.c. Deb. ...	71—76	...	...
75,000	,,	May 28	†10	†10	Malta & Mediterranean ...	200—210	...	...
392,000	—	Apl. 3	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	98 - 103	...	...
231,978	Stk.	Feb. 19	5	5	M. S. Utility "C." Cons. ...	113 - 118	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	96 - 101	...	100½—101
360,075	,,	June 11	4	4	Do. 4 p.c. Deb. ...	100—105	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	119—124	...	...
125,000	—	July 2	...	11/8	Do 3½ p.c. Rd. Rg. Bds.	97—100	...	...
675,000	,,	May 28	†6	‡13	Montevideo, Ltd.	60—65	...	...
2,061,315	,,	Mar. 5	5	5½	Newcastle & Gateshead Con.	25/6 - 26/6*df*	+-/1½	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	101—102*d*	+1	...
776,706	,,	June 11	3½	3½	Do. 3½ p.c. Deb. ...	90½ - 91½*d*	...	...
277,285	,,	May 7	5	5	Do. 5 p.c. Deb. '43 ...	105 - 107*d*	...	...
274,000	,,	Feb. 19	5	5	Newport (Mon.) 5 p.c. max.	107—109*a*	...	...
204,940	,,	Mar. 19	7½	7½	North Middlesex 6 p.c. Con.	155 - 160	...	...
396,160	,,	Feb. 5	5	5	Northampton 5 p.c. max. ...	104 - 109	...	106½
300,000	,,	May 7	†9	†7	Oriental, Ltd.	155 - 160	...	...
416,617	,,	June 11	8	8	Plym'th & Stonehouse 5 p.c.	167—172	...	...
504,416	,,	Feb. 19	8	8	Portsm'th Con. Stk. 4 p.c. Std	168 - 173	...	170½—172
241,446	,,	,,	6	6	Do. 5 p.c. max. ...	105—110	...	...
114,000	,,	July 23	5	5	Preston 5 p.c. Pref.	101—106*	...	...
1,736,968	Stk.	Mar. 19	6	6	Sheffield Cons.	139—141*e*	...	...
95,000	,,	July 9	4	4	Do. 4 p.c. Deb.	100—104*e*	...	...
133,201	,,	Feb. 19	8½	5	Shrewsbury 5 p.c. Ord. ...	137—142	...	...
90,000	10	May 28	14	13	South African	2—4	...	...
889,095	1	May 7	1/2⅝	1/2⅝	South-East'n Gas Cn. Ld Ord.	27/9—28/9	...	28/4½ - 28/9
736,061	1	Apl. 9	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref.	21/9—22/9	...	22/9
450,000	Stk.	Feb. 12	—	7½	Do. 4 p.c. Red. Deb. ...	101—103	...	...
6,709,895	,,	Feb. 19	5	7	South Met. Ord.	135—138	...	135—138
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	142—147	...	...
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf.	103—107	...	105½—106½
1,895,445	,,	June 25	3	3	Do. 3 p.c. Deb ...	84—87	...	87
1 000,000	,,	July 9	5	5	Do. 5 p.c. Red. Deb.	113—116	+1	114½
209,820	,,	Mar. 5	8½	8½	South Shields Con.	165—168*d*	...	...
1,543,795	,,	July 9	6	6	South Suburban Ord. 5 p.c.	132—135	+1	132½ - 134½
512,825	,,	,,	5	5	Do. 5 p.c. Pref.	120—125	...	122—122½
300,000	,,	,,	4	4	Do. 4 p.c. Pref.	101—106	...	...
868,837	,,	June 11	5	5	Do. 5 p.c. Deb.	121—126	...	122½
100,000	,,	,,	4	4	Do. 4 p.c. Deb.	103—107	...	...
647,740	,,	Mar. 5	5	5	Southampt'n Ord. 5 p.c. max.	110—115	...	...
121,275	,,	June 11	4	4	Do. 4 p.c. Deb.	99—104	...	...
350,000	,,	Mar. 5	5½	5½	Swansea 5½ p.c. Red. Pref.	107 - 112	...	...
200,000	,,	June 11	6½	6½	Do. 6½ p.c. Red. Deb.	100—105	...	...
1,076,490	,,	Mar. 5	6½	6½	Tottenham and District Ord.	153—158	...	...
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	126—131	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	115—120	...	...
199,005	,,	June 11	4	4	Do. 4 p.c. Deb. ...	98—103	...	...
349,110	,,	Mar. 5	7	7	Uxbridge, &c., 5 p.c. ...	151—156	+1	156
86,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	112 - 117	...	...
1,322,220	,,	Mar. 5	7	7	Wandsworth Consolidated	157—162	...	157½—160
1,096,373	,,	,,	5	5	Do. 5 p.c. Pref.	121—126	...	123—124
1,317,964	,,	June 11	5	5	Do. 5 p.c. Deb.	121—126	...	123½
158,400	,,	Mar. 5	5	6*g*	Winchester W. & G. 5 p.c. Con.	115—120	...	...

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock *g.*—Paid £3, including 10s. on account of back dividends. * Ex. div. † Paid free of income-tax. ‡ For year.

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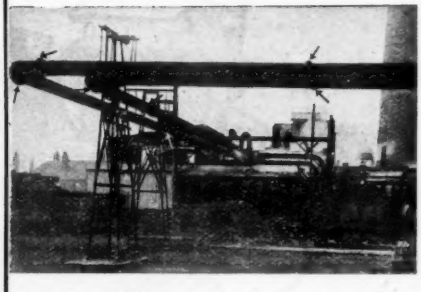

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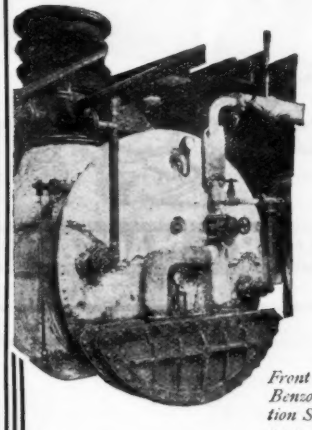

Front View of Benzol Rectification Still. Pressure on Steam Chest, about 80 lbs.

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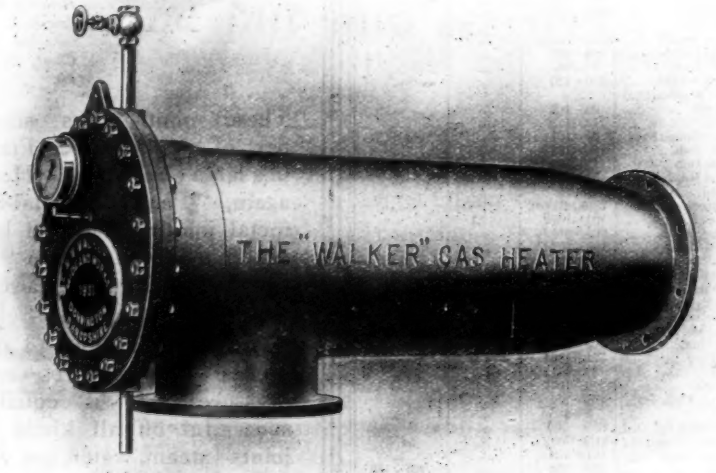

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